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The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

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[OFFICIAL NOTICE.]

Sixth Annual Meeting, Pacific Coast Gas Association.

OFFICE OF THE SECRETARY, OAKLAND, CAL., June 6, 1898.

The sixth annual convention of the Pacific Coast Gas Association, Mr. F. H. Eichbaum, President, will be held in San Francisco, on Tuesday and Wednesday, July 19 and 20, 1898, in the office building of the San Francisco Gas and Electric Company; morning sessions, from 10:15 to 12:30; afternoon sessions, 2 to 4:30. The Board of Directors will meet on Monday, July 18, at 8 P.M., at headquarters, which are hereby established at office of Mr. E. C. Jones, Chief Engineer San Francisco Gas and Electric Company, No. 413 Post street.

Copies of all papers, questions and applications for membership must be mailed to Secretary prior to July 18. Members to whom questions are assigned are requested to send answers promptly.

Papers will be submitted by the following members, on subjects to be announced:

E. C. Jones, San Francisco, Cal.; C. O. Poole, San Francisco, Cal.; John L. Howard, San Francisco, Cal.; O. M. Gregory, San Jose, Cal.; F. Foveaux, San Francisco, Cal.; John A. Britton, Oakland, Cal.; W. M. Parker, Bellingham Bay, Wash.; A. Gutsch, Fresno, Cal. In addition to his address as President, Mr. Eichbaum will continue his "Reminiscences."

Mr. George H. Hollidge, of Merced, Cal., has charge of "Wrinkles," and Mr. John Clement, of Red Bluff, Cal., is directing the "Experiences." It is hoped the members will contribute liberally to both of these departments.

An excursion is arranged for Thursday, July 21, particulars of which will be hereafter announced.

The Secretary has on hand a number of bound copies of the "Proceedings," which are purchasable at $2 per copy.

JOHN A. BRITTON, Secretary.

[OFFICIAL NOTICE.]

Wrinkle Department, Pacific Coast Gas Association.

MERCED, CAL., March 11, 1898.

To the Members of the Pacific Coast Gas Association: At the last meeting of the Pacific Coast Gas Association to me was delegated the duty of collecting and presenting any matter, in the shape of original ideas or special devices, which may come under the head of "Wrinkles," to be presented in proper form for the benefit of the Association at the next regular assembly.

Many of our members having charge of gas plants on the Coast have many plans, that are practical, handy and labor-saving, which many others by force of circumstances have never seen, but who, on presentation of the device, drawn and described, or through the medium of our official organ (the AMERICAN GAS LIGHT JOURNAL), would gladly embrace the opportunity, and put into practice a plan very beneficial—which perhaps had been in use in some obscure place many years, used exclusively by one man—that would, when given daylight, benefit the whole gas fraternity.

On reading this communication, please see if you have not forgotten

something in the shape of a "Wrinkle," that is doing good service in your works, that would be of great importance to the Association. Your answer to this will greatly oblige.

GEORGE H. HOLLIDGE,
Editor "Wrinkle" Department.

BRIEFLY TOLD.

DEATH OF MR. HENRY BAUMGARDNER.—Mr. Henry Baumgardner, of Lancaster, Pa., died at his home in that city on the afternoon of May 30. Deceased was one of those who not appreciating the value of home possession early, took it for granted that others did, and accordingly sold or leased his interest in the Lancaster Gas Light and Fuel Company, over the fortunes of which he had presided for many years. At one time (possibly at his death) he was President of the Reading (Pa.) Gas Company. Deceased was born in York, Pa., February 9, 1821, and absorbed his first and last tuition in the Gettysburg (Pa.) College. Going from school, he came to service with the Lancaster firm of Baumgardner & Carson, of which concern his brother Thomas was senior partner. In 1842 Mr. Carson died, and the subject of this memorial note took the dead man's place. The brothers carried on the business named up to 1850, when they disposed of their trade to engage in coal dealing. This traffic the brothers carried on to Mr. Henry Baumgardner's death. Deceased was prominent in the general business and social life of his city. He married twice, but of his blood only three survive —one son and two daughters. His second wife also lives. He was a member of the Lutheran Church.

NOTES.—The proprietors of the American Meter Company, still having an abiding faith that New York is a pretty good center in which to conduct business operations, have purchased a very eligible plot whereon it is in due time proposed to construct a factory that will in every sense be up to its expanding business. The purchased property is on the northeast corner of 11th avenue and 47th street, and anyone who looks over the location may easily assure himself that, for light and air, the American Meter Company's new shops will be quite up to their old ones in Arch street, Philadelphia, if the designers do their best.——Mr. Maurice Graham, of Graham, Morton & Co., of Amberly House, London, England, writing to us, under date of May 28th last, says: "I read with pleasure a letter of questions and answers, ably written by Mr. Frederick Egner, in your issue of May 9th, and I wish to corroborate many statements that he made. I am surprised myself that the system of inclined retorts has not been more largely adopted in the United States, for it offers many facilities for reducing carbonizing wages. In many installations erected by myself wages have been reduced 70 per cent., and in the last construction, which I erected at Milan, the contract for which included elevating and conveying the coal, storing it in overhead hoppers, with arrangement for charging the retorts, and guaranteeing even distribution along the floors of the retorts, the saving was over 70 per cent. I may say also that I am responsible for the erection of the large installations of inclined retorts at Leeds and Huddersfield. * * *"——Jno. W. Walker has been appointed an inspector of gas meters for the Brooklyn district of New York. It is even money that Mr. Walker does not know the difference between pressure and vacuum.——Bellevue, Ohio, wants an artificial gas plant.——Mr. Chas. E. Emery, a well-respected member of the electrical profession, died at his home (370 Gates avenue, Brooklyn), on the morning of the 1st inst.——The report of the President of the Portland (Me.) Gas Light Company, which covers its operations for the twelvemonth ended April 30th, contains many interesting details. Mr. Daveis, who has directed the Company for many years, notes that the output for the last year was 77,033,800 cubic feet, which meant a gain of not far from 7 per cent. over the sendout for the last corresponding period. The coal carbonized amounted to 7,032 tons, and the naphtha used for enriching was 53,908 gallons. The average candle power of the gas was 19.16 candles. The total number of consumers is returned at 3,764, a gain for the year of 210. Gas stoves to the number of 242 were placed in the twelvemonth, bringing the gross number in use up to 1,095. There are 5,082 Welsbach lights in service, of which number 1,091 were placed in the twelvemonth. About 1½ miles of street mains were laid, and many important betterments were completed on the plant, not the least important of which was a new storage holder rated to store 250,000 cubic feet. The holder was constructed by the Davis & Farnum Manufacturing Company, and Engineer Yorke states that the vessel worked perfectly from the first time it was filled.

[OFFICIAL REPORT.—REVISED BY THE SECRETARY.—Continued from Page 901.]

PROCEEDINGS, TWENTY-FIRST ANNUAL MEETING, WESTERN GAS ASSOCIATION.

HELD AT THE RUSSELL HOUSE, DETROIT, MICH., MAY 18, 19 AND 20, 1898.

FIRST DAY, AFTERNOON SESSION, MAY 18.

The President introduced Mr. Charles H. Raynor, of Adrian, Mich., who read the following paper on

THE PREPAYMENT METER.

Mr. President and Gentlemen of the Western Gas Association: When called upon by our worthy Secretary to present a paper before this Association, I do not think I fully realized what I had undertaken to do, or I should have left the subject to other and more competent hands; but, as I am in for it, I will endeavor to bring to you some facts, figures and suggestions that have come to me through the courtesy and kindness of the many friends of our Association, whom I have taken the liberty to call upon for assistance, and who have most generously responded.

I will not say anything of the development or mechanical construction of the prepayment, automatic or coin meter (whichever you choose to call it), but rather speak of it as a means to an end, when placed in the hands of an enterprising gas man who is after business.

Our GAS JOURNALS have given us much valuable information in regard to its introduction, more especially in Europe. I shall limit my paper more particularly to the experiences of several companies scattered over the length and breadth of our States, and mostly outside of our Association; some in cities using a large number of meters, and some in small towns with only a few.

Having obtained information that these companies were using prepayment meters, I addressed a letter to them containing the following questions:

1. Number of meters in use?
2. For what class of customers (more especially) do you use them?
3. Have you obtained satisfactory results?
4. Have you anything in particular to suggest?

To the first question, "How many prepayment meters in use?" I have answers representing a total of about 45,000 meters, ranging from 30 to 30,000, divided among 15 companies.

To the second question, "For what class of consumers (more especially) do you use them?" I here quote many of the answers as received.

"Newly solicited consumers, saloons, and persons we would or could not trust."

"Tenement blocks, barber shops, tailor shops, and dead-beat fellows generally."

"For customers of limited means, occupants of apartments, tenements or parts of houses, to whom payment of a deposit would be burdensome."

"Those who could not pay a month's bill in a lump. To extend the use of gas among the poorer classes."

"Almost entirely to those we could not reach in any other way."

"Almost entirely new business."

"Wherever they will take one; slow pay or dissatisfied customers."

"To cater to the poorer and irresponsible parties, and to reduce the cost of handling the business."

"To increase stove business; to help those who could not pay, and to force those who would not pay."

To the third question there has been but one, unanimous answer—that results have been most satisfactory.

To the fourth question, as to what suggestions they would offer, I believe my correspondents have fully covered the ground in offering the following:

"The increase of electric lighting makes necessary the gas man's finding wider fuel market for his gas. The present oil consumer, even if induced to burn gas instead of oil illumination, will not average more than $1.50 per month; he will be more readily obtained as a gas consumer by the prepayment meter than by the ordinary meter, and experience already shows that he will burn more than as much again with the prepayment meter, using gas for fuel."

"The American gas man, up-to-date, has been selling his product to those who live comfortably and ofttimes in luxury. The great multitude he has not had as consumers. The ferry company, the street railway company, the 1-cent daily newspaper publishing company, have

had the multitude as daily customers, because they took the people's money in small daily payments. The gas man has not had the multitude, because he did not deal with them in the same manner. With the prepayment meter he puts himself on the same basis. He has been about the only manufacturer who practically refused to take the customers' money before delivering the goods. With the prepayment meter he changes his attitude."

"Many possible gas consumers buy coal at the corner grocery, paying exorbitant prices per ton; whereas, with the prepayment meter, we could sell these same people gas for fuel and be a philanthropist in the money saved the consumer."

"Many a possible consumer is lost because of the fear of the gas bill. With the prepayment meter this fear cannot exist."

Another writer says:

"I know of no better way to increase the consumption of gas than by the judicious use of the prepayment meter."

And another says:

"I always prefer to set a prepayment meter wherever the customer will have one. We urge them upon all slow-paying customers, and insist upon the prepayment meter if very slow pay; recommend them wherever a customer is dissatisfied."

Mr. McGregor, in his paper, "Winning Ways of Gas," read before the New England Association, in February, and published in the AMERICAN GAS LIGHT JOURNAL, March 14, 1898, says:

"If I have any inclination to be enthusiastic over any one special feature, it is the 'prepayment meter,' for it does indeed fill a long-felt want. How often have we all regretted the necessity, imperative as it has been, for demanding a deposit from strangers, the indigent, the irresponsible, or the unreliable. We have often felt like taking chances, yet prudence forbade. Now, however, we light for all. Whoever will may burn gas, by the insertion in the meter of the necessary coin. I am delighted to cater to this class of people. Heretofore they have endured the insufficient oil with all its dangers, odors and drawbacks. It is certainly a higher education for them, and will tend to develop a demand for other improvements. In January, 1897, we placed our first prepayment meter, and have at present in use 575. Ninety-six of these were for parties who formerly gave us trouble in collection of their bills; but now, to the entire satisfaction of all concerned, we are saved this expense and annoyance. I may further state that we receive $1.50 per 1,000 for gas through the prepayment meter, while from the regular meter we get $1.35 to $1.40 per 1,000. The extra 10 or 15 cents per 1,000 goes to reduce the cost of the more expensive prepayment meter."

In England the companies have gone quite extensively into the business of equipping houses with piping, gas fixtures and fuel appliances, and have found that the outlay has been profitable in the increased use of gas.

One very noticeable effect in London has been the increase of the Sunday consumption. It is on that day that the average workingman has his best dinner, and so many of that class are now using the prepayment meter that the gas output for Sunday has come up to almost an average with the other days of the week. The large number of the meters now being used by workingmen makes gas almost a necessity to all of the same class, who find it economical, in that it can be purchased the same as other commodities are purchased (that is, so much at a time and as required), which is a special feature of value to a class of people not now reached in this country by the ordinary methods of gas companies.

There are a number of places where these meters have been largely and successfully introduced in this country, as in New York city and Brooklyn, especially New York city. Now the owners of tenement houses will go to the expense of arranging their houses so that the prepayment meters can be used, thereby presenting an additional advantage in their flats over the old-style flats. And some of the owners actually go to the gas companies to obtain information on the subject. When the gas business reaches that stage, when landlords have to arrange for these meters to secure good tenants, it certainly occupies a much better position than formerly.

Another great advantage of the prepayment meter is that the gas company, in advertising and pushing it, effectively refutes the idea that gas is a back number.

Another is that, owing to the tendency of large hotels, office buildings, and other institutions to put in electric plants, gas companies are losing some of their largest customers, and the only direction in which to make up this loss is to find new consumers who will use gas for both light and fuel. The prepayment meter permits obtaining these customers among a large class not now supplied, and who cannot be reached by any other means.

The prepayment meters have now been in use a sufficient length of time to demonstrate their efficiency, so that gas companies are no longer making experiments in purchasing them. Perhaps some of the companies who first introduced them may have had some trouble, but that was simply in the mechanism, and has been remedied, and is now a thing of the past.

As to the price of the prepayment meters, almost the only answers I have speak of that as being too high were: One party who was thinking of introducing them, and one other who, having had a meter in his office for a year, was in doubt as to whether it was worth while to try to use them. Now, this latter gentleman you all know to be an energetic, progressive gas man, but I do not think he looked at the matter in just the right way—possibly from only one point of view.

One other complaint was that the cash box was too small, at least in one instance, where a 20-light meter required collection at least once in 10 days.

Among the many complimentary expressions used by my correspondents are the following:

"I will use no other in the future."

"I have 750 in use; expect to set 750 this year."

"Average consumption small, but all clear gain."

Some have expressed a desire to hear fully discussed the best methods to take care of the money from these meters, and of keeping the accounts.

I have tried to make this paper as concise as possible, yet to have said sufficient to bring out a good discussion, that we may hear what is to be said in the negative as well as the affirmative; not so much for the information of those of us who have had the experienece, but because there are many among us who are as yet in doubt

Mr. President and Gentlemen, I thank you for your kind consideration and patience in listening to these rambling remarks, and I assure you that, if I may have scattered a seed that will bear fruit in the future, I shall feel most amply repaid for the effort.

Discussion.

Vice-President Thompson (in the Chair)—This most interesting paper by Mr. Raynor is on a subject which, from the tenor of his correspondence, seems to have met with but one feeling from everyone who has used prepayment meters. Happening to know that Mr. Raynor has met with some very interesting and amusing experiences in the use of the prepayment meter, I hope he will narrate them. I hope there will be a full and free discussion on the paper he has read.

Mr. T. D. Miller—As I want to learn more about the prepayment meter I will start the discussion. Regarding the expense of the prepayment meter, as stated on page 4, I may say I do not believe I could put in a single prepayment meter if I had to pay the meter rate for it. The consumers want to know if they have to pay any more for the gas. I reply, "No, the same rate; and you get the discount when you pay." I expect to get pay for the extra cost of that meter in the number of bills which I will not lose. I will not lose anything with the prepayment meter; with the regular meter I had many outstanding bills. A thought occurs to me as to a use to which the prepayment meter may be put. Suppose a gas company has a gas meter in every room at a hotel. If a guest wanted a fire in his room he could drop a quarter in the slot and have his fire; whereas, as it now is, he must pay 50 cents for it, and have the fire kindled, meanwhile having to wait for the kindling and coal to be brought. In many hotels I believe the gas companies could afford to put prepayment meters and gas heaters in every room. This, of course, is merely a suggestion. We had one consumer who came up very promptly before the 10th of the month with his check, but it required six or eight visits to the bank before we could collect the check. I have had the teller of the bank hold the money until he got on hand enough to pay the check, then he would telephone me and I would get the money; but such is not the case now, for he has a 30-light slot meter, and the box is "robbed" every 10 days. A great deal less shoe leather is used now than there was when collecting the money under the former plan. As to keeping an account of the collections from prepayment meters, I have a system therefor, and to learn if I can improve it let me state it to you. The collector is sent out carrying sacks numbered for each meter, the collection is made, and the sacks are returned to the office, where they are opened and the money counted, the amount collected being put down in a column which we use ordinarily for entering up the day that bills are paid. The amount of money due is then deducted from the amount collected, and the excess is carried over into the next month's column, the surplus cash on hand being credited to the account of shortage and over cash on slot meters. That account will run from $10 to $60 per month.

In October last we began to put in the slot meters, and now have in use about 200. It has taken nearly all the surplus money we had to buy meters. In making these collections we have small canvass sacks, and the man starts out on a route, with the sacks arranged accordingly. He puts these sacks in a small valise, goes to the house, takes the sack out, sees that he has the correct number to correspond with the meter, collects the money and puts it in another hand bag. We started in by counting the money right there. I thought at first that was a bad thing, and am now satisfied it was, because the consumer will stand by and see how much money is taken out. If you get too much the man knows it. We had a man who put in a gas meter a few years ago, and put up $15 deposit; at the end of the month his bill was $14; he never in the world would have paid the bill if we had not had the deposit. He got his $1 back and had the meter taken out. Then we put in a slot meter for him—it was when the tin box first went out—and at the end of the month the box was full of coin. We empty it twice a month now, and are getting $30 or $35 from him each month, and he is perfectly satisfied. He knows that he is putting in more than $15, but he doesn't know just how much.

Mr. Butterworth—Practically our experience with prepayment meters in Columbus has been confined to the last six months. We use them for the purpose of securing new consumers. Previously we had out but very few for ordinary use; but last autumn we thought we would see if we could not get a few more consumers. First, I counted all the houses in the city not using our gas, on our present lines of mains; and by-the-way, it might be interesting for you to know how many I found. Of course we counted every house, big and little. We have a population of about 110,000, and had already about 8,000 meters in use. I found 6,000 houses on our present mains which were without meters. I was rather surprised to find there were so many. I divided the city into districts and put a solicitor in charge of each district soliciting new consumers on our present lines of mains only. I told them if they could not in any other way induce them to become consumers, to offer them prepayment meters. With us that was the last resort. We used every other argument we could before suggesting the prepayment meter. In this way we secured about 600 new consumers in a couple of months, but most of them were obtained only by offering to put in prepayment meters, without expense to them, without making any extra charge for the gas. As the meters cost them nothing they were willing to put them in. About 16 of those prepayment meters were never used at all; we never found any money in the boxes. After waiting two or three months we took those out. During the six months we have probably removed and placed in other positions about one-third of these meters. The increase of consumption which we have gained in this way is rather disappointing. Leaving out a few meters, which used exceptionally large quantities of gas, the average has been about 600 feet per month. I do not feel that our experiment in the use of prepayment meters has been eminently successful in the way of getting new business; but I do think that we can continue to good advantage the 450 prepayment meters that we have, and perhaps add to their number.

The Chairman—Mr. Dole has had some experience in the introduction of prepayment meters and we shall be glad to hear from him.

Mr. Dole—I do not know I have anything to add to that which has been already said. Had I known that I would be called upon I would have brought with me some data. We have quite a number of prepayment meters in use, and are very well satisfied with the result obtained. I think that, barring one or two using an excessively large amount of gas, they will average a consumption pretty close to 1,000 feet per month. I struck an average sometime ago that figured more than 900 feet, and I think that average has increased in the last three months. We have had very good success in putting them in for people who had been a constant source of annoyance to us. I quite agree with Mr. Miller in his suggestion, that the prepayment meter enables us to save so much in our collection, or rather to save so much of what was formerly lost, that the extra cost of the meter does not figure at all in our calculations. We do not think that the extra $2 added to the cost of the meter amounts to anything in proportion to the saving there has been to us in the account. It has more than paid for itself in that way. I feel I can safely make those two statements to you.

Mr. Runner—The Secretary requested me to give my experience with prepayment meters. We have had some in use for several years. I have no criticism to offer to the paper, for it is all right in the line of my own experience. We began the use of prepayment meters by putting them in the houses of those who always told the collector to "Call to-morrow;" and to-morrow would tell him to "Come next week." We then added the other class, who also found fault with the amount of their bills. From the first we have put them in for the itinerant—the man who is here to day and to-morrow goes somewhere else, who lives between the rising and setting sun, and as our money is in the box next morning we go for it. We always use it as a last argument in pushing the sale of gas stoves. As one gentleman said, in canvassing for the use of gas it is the last argument that gets the consumer, and I have used that argument in selling gas stoves. We sold 130 stoves during the months of March and April; and the prepayment meter helps us to get new consumers on the gas stoves. We have found that the increased consumption of gas more than pays the extra cost of the meter. We have yet to find the first consumer who burns less than 10 per cent., or 15 per cent. more than he ever did before, and some will even go as high as 100 per cent. The class of consumers who always kick about gas bills are entirely satisfied with the prepayment meter. We have very fierce electric competitors, and they make a flat rate—in fact they make any rate to get a consumer; but if we have in a prepayment meter we have our customer; they cannot touch him for he feels entirely satisfied. I do not quite agree with the author of the paper as to the price of the meter. It does seem to me that the price is exceedingly high in comparison with the standard meter. It adds 100 per cent. or more to the average price of meters used in small towns, which makes it an expensive luxury; but if we cannot get it any cheaper, we still consider it a good investment, because we do not lose any bill. We put it in for people who are slow in paying or who are dissatisfied, and in that way we are able to hold our trade perfectly secure.

The Chairman—I would like to ask for information upon two points. Has any member experienced the loss of money by the pilfering of the money boxes before the arrival of the company's collector; and is it customary to set the coin mechanism at the same price for gas charged to other consumers, and trust to the saving in bad debts to pay the increased cost of the meter, or whether an increased price was charged?

Mr. A. C. Humphreys—I can give a partial answer to the first question. I know one district in New York city where they set prepayment meters for use in tenement houses, and the meters unfortunately had to be set out in the hallway, owing to the manner in which the houses were piped. This was almost invariably the case at first. It went along quite smoothly for a while until some hoodlum caught at the idea of breaking open the box and collecting all the change, and then it became a regular epidemic. The last I heard about it they proposed to abandon the use of those meters for that particular business, unless they could induce the landlords to repipe the houses in such a way that the meters could be set inside of the apartments. They considered it a very serious matter and did not see how they could overcome the trouble otherwise. The coin box was of cast iron.

Mr. T. D. Miller—We have never had the boxes pilfered, but we have sometimes found in the boxes quarters with strings tied to them, and several times we have gotten out Mexican quarters that had slipped through. One old German resident said, "I will always put in new quarters, it makes more gas come every time." (Laughter.)

Mr. Dole—I would like to reply to the two questions. First, as to money being stolen. We had two cases where we thought the money was stolen, but in those instances we were not very much surprised. I think there would be very little trouble from pilfering if the meters, instead of being put in the cellars or out-of-the-way places, were located in a good place in the building. As to advancing the price of gas sold through prepayment meters beyond the regular price, I will say that we have meters set both ways in our town. We have some set at an advance of quite a percentage, and have some that will net the regular price of gas. My judgment is that hereafter we will as a rule set the meters at the regular price. We think the prepayment meter increases the safety and the assurance of getting our money, and will warrant us in an extra outlay for the meter. One thing, however, that occurs to me, is this: Sometimes we have a case where a party wants to pay for his supplies on the instalment plan. We set the price at $2 per 1,000 for the gas, and the excess of payment is applied on their account. In that way we are introducing gas without any difficulty. I suggest that as a means of increasing the consumption in a legitimate way, and without having the fact thrown in your face that an extra tariff is placed upon the gas bill. I am not in favor of charging more for gas used through the prepayment meter than through the ordinary meter, except under such special circumstances.

Mr. Runner—We invariably have it understood by our consumers, when we put in a prepayment meter, that the amount of gas indicated by the meter is what will have to be settled for. If they "work" the meter, and we do not get the money, we call them up to the captain's office, and they pay the bill. We have only had one experience of

that kind. One consumer did "work" the meter to the extent of $5. I called his attention to the discrepancy, and he did not have a word to say; he simply paid up the money to make the difference. He evidently knew how it came about. On another meter, if they put in a Canada quarter or a smooth quarter it will not work the meter. A man came to the office a few days ago and said there was something wrong with his meter—that he could not get any gas; that he had just put in a quarter, but it did not give him any gas. We inspected the meter, put a new quarter in the box, and found that the meter worked all right. On opening the cash box it was shown that he had put in a Canadian quarter; consequently he got no gas for his money.

Mr. Jenkins—How did he work it?

Mr. Runner—He did not let us into the secret. We proved the meter only to find it was correct as far as the work of measuring the gas was concerned.

Mr. J. R. Lynn—Do you say that a Canada quarter will not work the meter?

Mr. Runner—Yes.

Mr. J. R. Lynn—I was situated for the last five months in a locality where we received quite a number of Canadian quarters from prepayment meters, and I think the amount of gas consumed checked up very well with the amount of cash that our collector turned in. I will also state it requires a very considerable argument on my part to convince many of our most reliable consumers that it was not necessary for the gas companies to go to the expense of providing them with prepayment meters for their own convenience. I think that nothing speaks in a better manner of the popularity of the prepayment meter than the fact that the consumers themselves advertise it. It was purely through their advertising that such requests as those mentioned came to us. Respecting the working of the meter, the only instance we had where the gas was consumed on the account of anything but a quarter, was by the insertion of a washer; but when the meter reader taker came around the lady of the house called him to one side and gave him a $2 bill and wanted $1.75 in quarters, explaining that she had run out of quarters.

Mr. J. T. Lynn—We have had some experience in Detroit with prepayment meters. As to advancing the rate for gas which passes through a prepayment meter, I may say in many cities that would be out of the question, as the rate is fixed by city ordinance, and I do not believe that the gas company would be allowed to charge two prices for gas. As to the Canadian quarter business, I may say we probably get as many Canadian quarters as American ones, and it does not cut any figure with us whether Canadian or American quarters are used. All that is wanted is the size; it must take up the slot and turn the dial part. We had a very funny experience with a colored lodge, about a square from this hall. We had a great deal of trouble in getting the gas bills from those people. They would send us from one to another, and it would sometimes be two or three weeks before we could get a gas bill paid; and then it was always settled in 50 cent and $1 payments. We put in a prepayment meter there. They had been in the habit of using about $2 worth of gas per month. After the prepayment meter was put in the consumption jumped up, and we used to get $6, $7 and $8 per month out of the lodge. We wondered why it was they were burning so much more gas. The porter in the barber shop was a member of that lodge, and I said to him one day, "How is it that you fellows are burning so much more gas at the lodge now?" He said, "I will tell you how that comes about. Before that meter was put in the janitor used to chase us out of the lodge room as soon as the session was over, and as we had to go out, we always went down to the saloon and played cards. Now we stay in there. Sometimes we shoot craps, and sometimes we play cards. We take the 'ante' out for the gas, and always drop in a quarter every time." (Laughter.)

Mr. Raynor—Replying to the last speaker I can say his experience with that colored lodge is very similar to ours. We increased the consumption at least 100 per cent. when we put a prepayment meter in a colored lodge. The best feature of the prepayment meter is that we can use it for getting new business, or in places where we did not have any meter. We can with it get consumers where we did not think it possible. We knew that we could not get them in any other way. They had been burning oil, and as they would send out and get 10 cents' worth of oil with which to lighs their shops they were quite satisfied. The first prepayment meter we set was in a barber shop. We asked the privilege of putting the meter in there. We told the barber that his light would cost him so much; that he could drop a nickel in the meter and that his light would cost him half a cent per hour. We told him he could pay $1 per month on account of the fixtures. We got the privilege of placing the meter on a shelf at the side of the shop where everyone could see it. Everyone who went into his shop saw that meter and everybody heard a good word for it. It was not 24 hours before we had a call for one in another barber shop; and now we have 12 or 15 in barber shops. We generally set the meter at the side of the shop, so that it is the most prominent feature in the place. There is not a man who would have it taken out under any condition. We claim that the extra price of the meter is better invested there than in any other advertising we could do. We had one consumer in a restaurant where the bills were about $10 or $12 per month. There was terrible kicking at the amount of the bill. They said they could not stand it, and wanted a prepayment meter put in. The meter was put in, and although the use of gas was increased at once between 50 and 75 per cent., there was no more kicking. That has been our experience. It has been an advertiser for us. In the barber shops it has been an excellent advertisement. Everyone who knows anything about barber shops knows that the barber tells everybody everything that he knows, and in that way they advertise the prepayment meters. Our regular price of gas is $2 per 1,000 feet, with 10 per cent. discount. We put the meters in at the regular price, which is perfectly satisfactory, and make no discount. I do not think myself that that is quite right. I believe the man who pays cash should get the best price. I think if anybody is entitled to a discount in price, the man who has a prepayment meter should get that benefit. We intend to push the use of the prepayment meter. We are putting them in now where our consumers are poor pay, or are very hard to collect from, and we shall introduce them more largely than we have done heretofore.

Mr. T. D. Miller—Another advantage in the use of the slot meter suggests itself to me. At San Antonio the occupant of a handsome residence came to the office and applied for a gas meter. The Secretary said, "Before you can get a meter you will have to pay your little bill and make a deposit." She said, "All right." We put in a slot meter and she was very much put out by it. She vowed that she would put in the electric light as soon as she could get the house wired. After ten days the Secretary thought he would like to understand what the meter was doing down there; and so he visited the place. He said to the customer, "Well, how about that slot meter? Will you have it taken out? Have you taken the electric light?" She replied, "No; that is a good thing; I would not be without it." The Secretary asked, "How is that?" She said, "With the old meter we used to have to pay the gas bill; now the company pays it." (Laughter.)

Mr. Jenkins—I think that is one of the "Recent Developments in Texas."

Mr. T. D. Miller—I am from Dallas.

Mr. Jenkins—This very interesting paper has lead to an interesting discussion on a subject in which all of us are interested, and we have all obtained some valuable information from both paper and discussion.

Mr. Harbison—I would like to say a word on the subject of slot meters. I am afraid we are getting a little bit away from the high standard which General Roome enunciated in the early history of the American Gas Light Association as to what sort of a standard the gas men should have before the world. We have had an experience meeting here within the past hour on the subject of this paper. The latest addition, and a very honorable one, to your list of honorary members, suggested to me, when the paper was about to be read, "You are opposed to the prepayment meter. Give careful attention to the reading of this paper." I have tried to do so, and also to do the "talks" which have been had, and which can hardly be said to be discussions on this paper. Perhaps it is a patriotic view to take of it—and this is a good time for that sort of thing—but it seems to me that we are being led right along on the silverite or 16 to 1 basis; that we cannot pay gas bills through this meter except with silver quarters. I state that for what it is worth. Take it home and think it over. It has been stated that this meter is a very valuable addition to our paraphernalia of working machines in the distribution of gas, in helping us to collect our bills. Now, we have never had a prepayment meter in Hartford. Our unpaid bills in the past 20 years will not average ¼ of 1 per cent. of the gross amount of our gas accounts. Let me repeat that, and let me ask you to take it home with you and think it over. Our unpaid gas bills did not average, for the past 20 years, ¼ of 1 per cent. of the gross amount of our gas accounts. Last year we sent out a little more than 200,000,000 cubic feet of gas. We think that the next census will give us 75,000 inhabitants in Hartford. We have considerably more than 100 miles of street mains. We have considerably over 8,000 meters in use. One man has not been fully employed in the past 10 years in collecting bills outside of our office. We supply all classes of people in the city. Do we need prepayment meters to help us in such a case? I do not like to hear it said here, and thrown out to the world, that gentlemen who are en-

gaged in this business, because of the meters they are using, charge one price for gas to John Smith and another price to John Jones. It is not the way to do. In my opinion that is not keeping up your reputation. You who are doing it must judge for yourselves, but I do not want that to go out as a way of doing business that I am willing to countenance, for I do not. I am willing to take my share of the criticism, but I want it understood just how I feel on the subject.

The Chairman—I am sure that the name of the honored former President of the American Association to whom General Harbison has referred, will be regarded by all of us as not other than progressive, and expressing the "room for improvement." General Harbison's does not seem to be a generous idea of the prepayment meter question.

On motion of Mr. Jenkins a vote of thanks was passed to Mr. Raynor. The President reassumed the chair and introduced Mr. Thos D. Miller, of Dallas, Tex., who read the following on some

RECENT DEVELOPMENTS IN TEXAS OF INTEREST TO GAS MEN.

In approaching a subject of this kind for the consideration of those not familiar with the general conditions, the necessity of a more or less historical sketch becomes apparent. In order that present conditions may be appreciated, a brief review of the gas industry in the State is given.

The first gas plant installed was in Galveston, in 1856. From an old application, dated 1868, the price of gas appears to have been $8 per 1,000 cubic feet, and from another application, dated 1872, it was $7 per 1,000. The present price is $2 and $1.50.

From an old cash book entry (1867) gas coal cost $12.82 per ton laid in the bins of the company. As the figures are interesting they are given.

May, 1867.

Invoice for 362 tons coal	$2,450.44
Freight on 362 tons coal	1,710.45
Wharfage on schooner "Evans"	181.00
Drayage of 362 tons coal	289.60
Total cost, 362 tons coal	$4,631.49

From the drayage charges it is easily concluded that labor was as high in proportion as coal.

The plant to-day has four full-depth regenerative benches, ample modern purifying apparatus and holder capacity. Owing to the poor foundations obtainable and the salty sub surface water encountered a few feet below the surface, several small holders have been put in. The salt water and moist atmosphere make the maintenance of any iron work in this city very troublesome and expensive. Shell lime is used for purification. The shells are accumulated in the oyster season and burned on the premises as required.

The Houston Gas Light Company was chartered October 9, 1866. In the original plant there were six miles of main. Gas was sold for $10 per 1,000, and the Company sent out its first gas in March, 1868, to about 60 consumers. The coal used here, as at Galveston, came from Pennsylvania. February 1, 1870, the price of gas was reduced to $7 per 1,000, and since that time periodical reductions have been made, until now the price is limited to a maximum of $1.80 per 1,000, by a renewed franchise recently granted the Company. The plant at the present time supplies a city of 50,000 inhabitants from a modern plant. Its generating apparatus consists of half-depth regenerative benches and a 5-foot standard Lowe double superheater water gas set. The purifying apparatus is new and up to date, and its storage holder is the largest in the State.

A Pintsch plant was installed by this Company in 1895.

The city of Jefferson was at one time an important point, and the history of its gas works, as told by Mr. J. W. Wrede, at one time connected with the plant, is interesting and instructive, as it illustrates the hazard in the installation of a plant of this nature in a rapidly developing country: "The Jefferson gas works were built in 1870, and the first gas was burned on July 4th. The works consisted of two benches of 3's, cast iron retorts, and a holder. The gas went direct from the hydraulic main to the holder. Condensers, scrubbers, purifying boxes and station meter were considered unnecessary, the consumers' meters being regarded as sufficient evidence of what was being done. The gas was made of pitch pine, split and packed into perforated sheet iron cylinders. These cylinders were put into the retorts and the mouthpieces closed. The ascension pipes were each supplied with a test cock to ascertain when the charge was burned out. The drip pump was an important tool there and tar a thing to waste and swear at. There were between three and four miles of main, and both wet and dry meters were used. The consumers paid $10 deposit for meter and also paid for meter connections. Gas sold for $4.50 per 1,000; 10-foot tips were in general use, and the sales were from 200,000 to 250,000 feet per month. Kicks were few; bills generally full grown; collections easy and wages good.

"The pitch pine was laid down in the yard at from $2 to $4.50 per cord, according to the quality of the wood and the necessities of the vender. There were street lamps galore, set up complete for about $15 each, and lighted by the Company for $6 per lamp per month, and all paid for in city script, most of which is still in existence.

"The completion of the railroad through Marshall knocked the bottom out of Jefferson and everything went to the demnition bowwows."

The plant at Austin was built in 1874, and gas was supplied in June of that year. The process was coal, the McAlester coal being used at that time. Price of gas was $7 per 1,000 cubic feet. Coal famines were frequent and cotton seed was resorted to on such o casions. The yield from cotton seed was about 4 feet of 12 candle power gas to the pound. The candle power was brought up to 16 with resin as an enricher. In 1882 Mr. Van Steenbergh and associates erected a plant and operated under the name of the Capitol Gas Company, in active competion with the Austin Gas Light Company. This competition resulted in a consolidation, which, however, was not perfected, as the State Legislature passed an anti-trust law, since which time the Capitol Gas Company has not been in operation. The situation in the lighting business in Austin is to day unusual. The city has a light and power plant operated by water power, and it is said that, at the rates power and light are being sold, there is not sufficient water to supply light and power enough to pay interest on the $2,200,000 bonds issued to pay for their very elaborate plant. The result is that the deficit must be raised by taxation, or default in the interest. The effect of this is not felt so much by the Gas Company as by the Austin Water, Light and Power Company, which latter Company is in the hands of a receiver.

The San Antonio gas works were established in 1860, since which time it has operated coal gas benches only. At the present time a standard Lowe 5-foot water gas set is being installed with the purpose of using the native oil. The price of gas at the beginning was $7 per 1,000, while at the present time it is being sold for $1.50 for fuel, and $2.25 for light.

The Dallas gas works were built in 1873. Price of gas at the time was $7 per 1,000. The process was coal, and the street mains were wood. The leakage account (over 50 per cent.), was so large and the growth of the town so rapid that new works and mains were put in in a few years. The price of gas was gradually reduced, and in 1889 it was made $1.50 for fuel and $1.90 for light. March of this year the illuminating gas was reduced to $1.70, the fuel remaining as it was. In 1897 a standard Lowe 5-foot water gas set was installed for the purpose of using the native oil. This was the first plant built in the State for the express purpose of using this product. The Houston plant is using it in preference to eastern and northern oil, as are also the Pintsch plants at Houston, Fort Worth and Texarkana.

Fort Worth installed a Lockwood oil gas plant in 1878, using the dollar and cent meters. In 1882 it was sold for debt, and the oil plant replaced with coal gas apparatus. This was in turn abandoned in 1891 for a new 12-inch works, with regenerative benches and new and modern purifying apparatus and holder. In May, 1894, this Company installed a Pintsch plant.

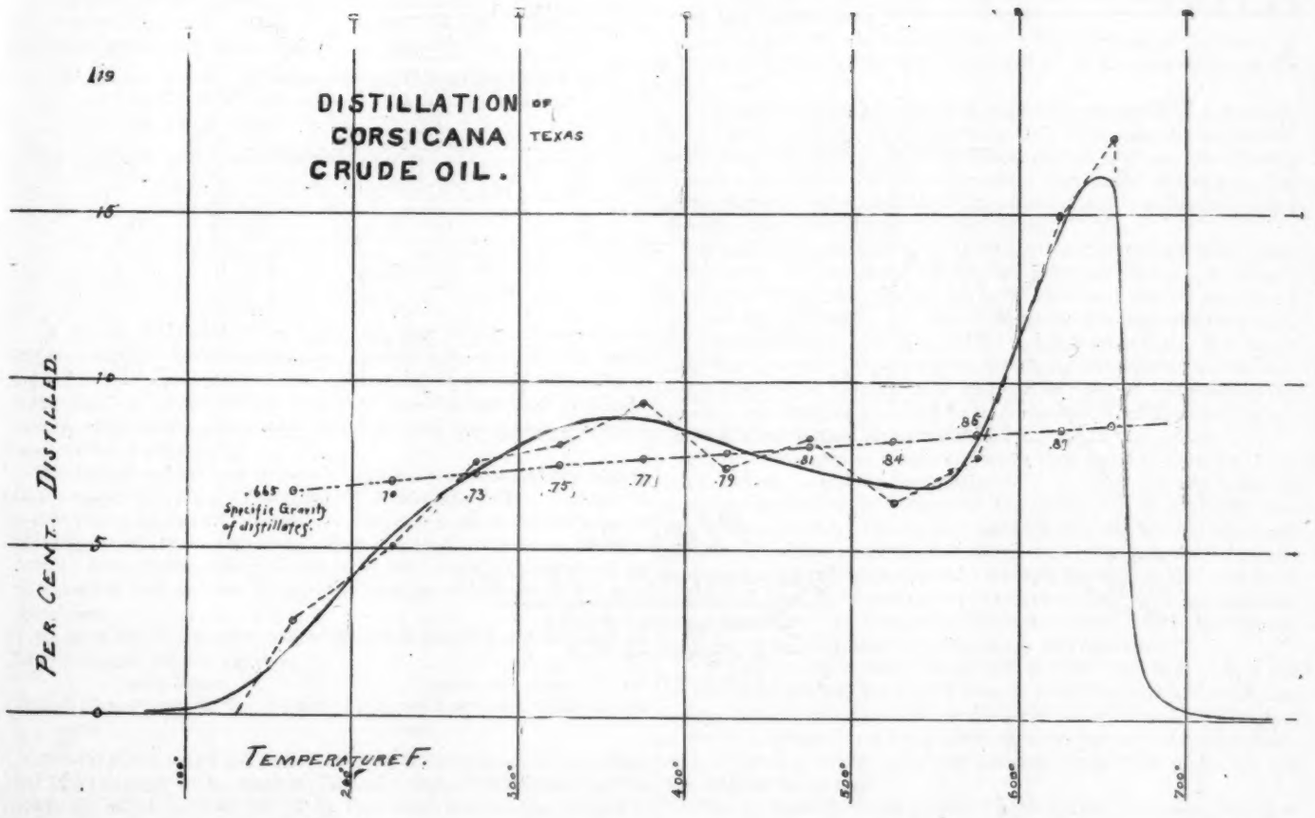
Gas works at Gainesville, Sherman, Paris, Texarkana, El Paso and Waco, are all operating coal gas apparatus, using the Indian Territory or Colorado coals.

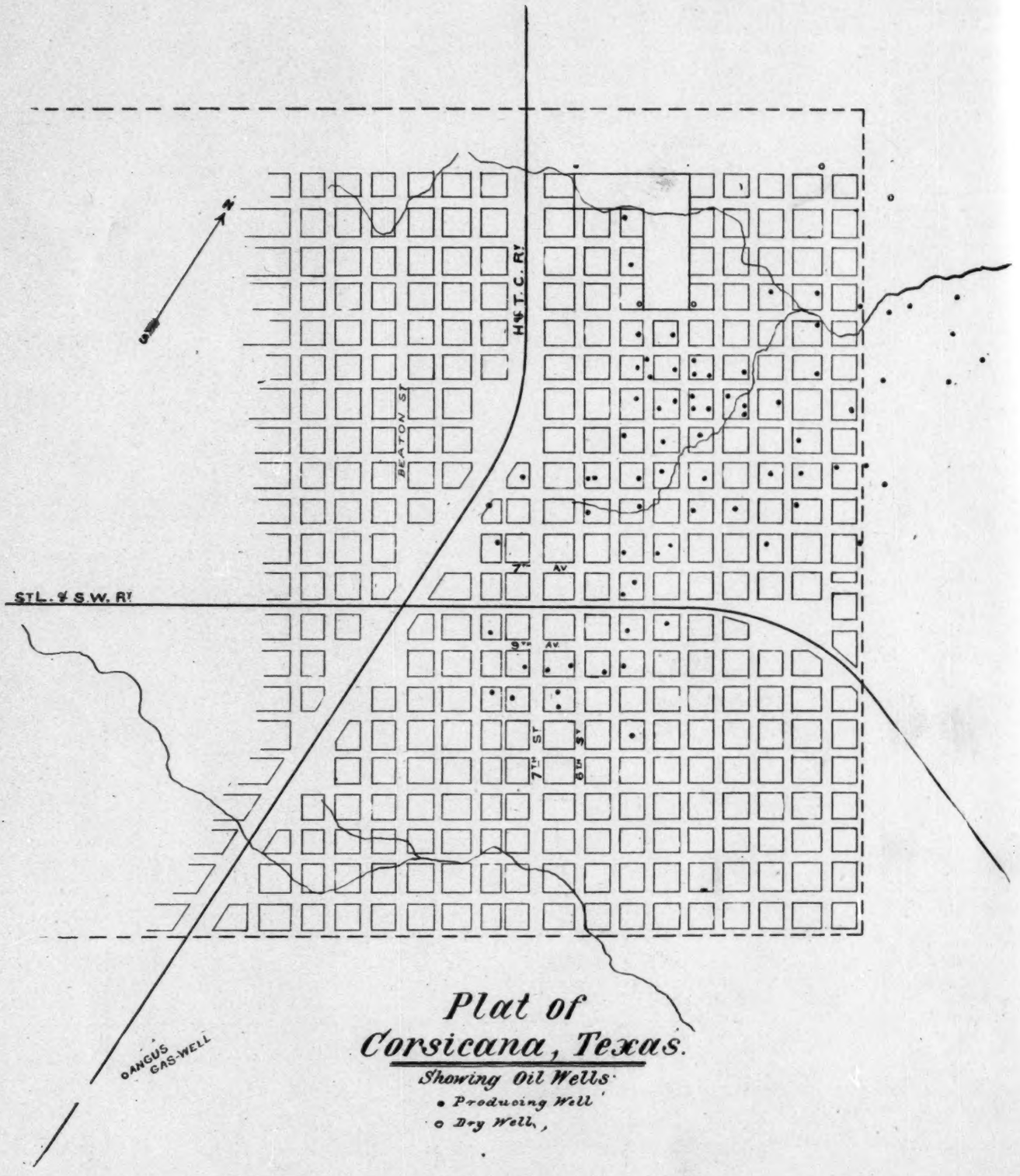
Corsicans installed a Van Steenbergh plant in 1886 and is still using it, making steam with native oil and gas with imported naphtha and Pennsylvania anthracite coal. The crude oil was tried in this apparatus, but it was not successful.

Some effort has been made in the past year to install gas plants in different towns and cities in the State to use the Hall process. Just what has been accomplished it is impossible to say. It was reported that a franchise had been obtained at Brenham, but the plant has not been put in operation yet.

In 1886 gas coal from the Indian Territory mines cost $5.25 per ton, 2,000 pounds f.o.b. at Fort Worth and Dallas. Until the development of the oil field the lowest price of gas coal was for the Dallas common points, $3.75. The prevailing price for the past season has been about 40 cents per ton less. This fall in price has not been due to the introduction of crude oil, but to the extensive development of the Arkansas and Indian Territory coal fields. Twelve years ago the Territory coal was mined and controlled by one combination and there was no coal in

GAS WORKS.
COAL DEPOSIT.
LIGNITE "
NAT. GAS.
RED R.
SHERMAN
PARIS
TEXARKANA
BRAZOS R.
GAINESVILLE
DALLAS
FT. WORTH
CORSICANA
COLORADO R.
WACO
NECHES R.
EL PASO
T E X A S
TRINITY R.
NAVARRO
AUSTIN
HOUSTON
PECOS R.
SAN ANTONIO
GALVESTON
RIO GRANDE
LAREDO
GULF of MEXICO


119
DISTILLATION OF CORSICANA TEXAS CRUDE OIL.
PER CENT. DISTILLED.
TEMPERATURE F.
.665 Sp. Gr.
Specific Gravity of distillates.
.73
.75
.77
.79
.81
.84
.86
.87
100°
200°
300°
400°
500°
600°
700°



Plat of Corsicana, Texas.

Showing Oil Wells

• Producing Well

o Dry Well,

the north Texas market to compete with the one product. Now there are several concerns offering good gas coal equal in all respects except as to its preparation, and almost any mine agent can prove that his system of screening and picking is the best.

Until recently the Colorado coals have been successful competitors in the coal market in north Texas, and this has had its influence in reducing the cost of gas coal. Galveston and Houston are still able to get Pittsburgh coal in competition with the Territory coals, as it can be transported by water to these points.

The following table gives one analysis from each of the principal coal deposits from which coal is shipped to the Texas gas companies:

	Mc Alester, I. T.	Hartshorn, Grady Basin, I. T.	El Moro, Colorado.	Victor Mine, Colorado.	Monarch Mine, Colorado.	Snowden Mine, Pittsburgh.
Water	2.10	2.48	.99	1.26	.20	1.04
Volatile matter	29.71	37.80	35.05	36.40	28.94	38.40
Fixed carbon	62.67	55.27	54.20	53.10	64.51	57.88
Ash	5.52	3.50	9.90	9.24	6.08	2.68
Sulphur	.60*	.95	.79	1.11	.27	1.25*

*Separately determined.

The coke yield from McAlester coal is 69.43 per cent., and the coke yield from the Victor, Colorado, coal 69.54 per cent., practically the same. These results are from a practical test, weighing the coal carefully into the retorts and, after drying the coke in the sun for 24 hours in midsummer, it was then weighed.

While the Colorado coals run higher in ash than do the McAlester coals, they are free from clinker, and in a large measure thereby compensate for the high ash. The writer has never seen a proper clinker from Colorado coal or coke. The Colorado gas coals will give, on the same yield, about 2-candle power better gas than the McAlester coals.

Texas coals proper have not proven of any value as gas coals, on account of their high sulphur, ash, poor coking qualities and the inferior quality of the gas yielded. The following is the analysis of the Rock Creek coal, mined near Weatherford, about 80 miles west of Dallas: Moisture, 3.60; volatile matter, 34.51; fixed carbon, 50.22; ash, 11.67; total, 100. Sulphur separately determined, or not determined at all, but assuredly high. A run was started at the Dallas plant on this coal, but the coke was so poor that it was abandoned.

There are several lignite deposits in various parts of the State which are worthy of mention in this connection. In 1894 a trial run was made on lignite from Henderson county, near Athens:

Charged at 9 A. M. 1,300 pounds lignite drew McAlester coke.
" at 11 " 1,300 " " " "
" at 1 P. M. 1,400 " " " "

The gas yield from this coal was as follows:

From 9 to 10 made 2,100 cubic feet gas.
" 10 to 11 " 1,900 " "
" 11 to 12 " 2,000 " "
" 12 to 1 " 1,700 " "
" 1 to 2 " 2,300 " "
" 2 to 3 " 1,200 " "

At 3 P. M. the retorts were again charged in regular order with McAlester coal. From the foregoing figures, and especially the make from 1 to 3, it was concluded at the time that there was from 2.50 to 2.75 cubic feet of gas to the pound of lignite about 14 or 15 candle power. The residue taken from the retorts very much resembled ashes and powdered charcoal.

The Laredo cannel coal is really a lignite, but partakes very largely of the nature of a cannel coal, and will yield about 5 feet of 22-candle power gas to the pound. It does not coke, and is not being used for gas making anywhere in the State. One car load was used in Dallas in 1896 as an enricher, and it would have been regularly employed for that purpose had not the freight rate been advanced and the oil field developed.

An analysis, by Cooper's tube, of the crude gas from this coal and the Log Mountain cannel is given:

Laredo Cannel.	Log Mountain Cannel.
H_2S = 1.1 per cent. CO_2 = 0.9 per cent.	H_2S = 2.1 per cent. CO_2 = 2.1 per cent.

Natural gas is found in the Brazos river bottoms in small quantities, but large enough to be used in isolated plants. The writer had his attention called to it by Mr. H. R. Hearn, in 1893, and undertook to utilize it. This was successfully done in July, 1893, since which time the plantation home has been heated and lighted, besides a 4-horse power gas engine has been supplied from these wells. The gas engine does duty an average of six hours per day. The gas comes up with the water from artesian wells, and is separated from the water and passed to a 500 foot holder, but the gas is wasting away most of the time and only a small portion of it is used. Mr. H. H. Harrington, Professor of Chemistry at the State Agricultural and Mechanical College, analyzed the gas. The analysis is given in the table below:

	Brazos.	Pittsburgh.
Carbonic acid CO_2	0.21	0.6
Carbonic oxide CO	0.75	0.6
Oxygen ....O	0.42	0.8
Olefiant....C_2H	0.00	1.0
Ethylic Hyd. C_2H_4	0.50	5.0
Marsh gas....CH_4	31.50	67.0
Hydrogen....H	23.30	22.0
Nitrogen ....N	40.15	3.0
Not determined	3.17	0.00
	100.00	100.00

The gas burns with a blue flame, tinged with yellow, is odorless, gives a good light with the Welsbach burner at 1 inch pressure, and gives a good heating flame with the atmospheric burner. This gas can be had almost anywhere in the river valley, but this is the only utilization of it.

Natural gas is also found in the vicinity of Corsicana and Calvert. The well near Calvert has been flowing for several years, and apparently shows no diminution in its quantity or pressure. In all the oil wells about Corsicana gas is noticed, and in several where little or no flow of oil was obtained, quite a volume of gas has been observed. The Angus well is such, and is located about one mile south of the union depot, on the east side of the H. & T. C. Railway. The middle of last March, this well, which was being bored for oil, at a depth of 1,040 feet, struck a strong flow of gas. The static pressure in the well is over 200 pounds. The well was carried to a depth of about 1,200 feet, and a small flow of oil was reached. The gas is of low vitality, but with a proper burner will give a good incandescent light; and it gives good results on the ordinary gas stove.

At this time the Corsicana Gas Company is trying it by mixing it with carbureted water gas. It is also being used under the boilers of this Company. It is estimated that this well furnishes about 100,000 cubic feet per 24 hours.

Another gas well was struck about 9 miles northeast of Corsicana, at a depth of 862 feet. This well is reported to be about as strong as the Angus well.

Petroleum is found in deposits of nearly all geological ages, from the Lower Silurian to the Tertiary Epoch. It is most generally and abundantly found in argillaceous shale and sandstone, and not infrequently in porous limestone. While it is widely distributed throughout the globe, there are only a few localities where it has been found in large enough quantities to justify its exploitation.

The first development of oil in the State was near Nacogdoches, about 30 years ago. Oil was found about 15 miles south of the town, at what is known as Oil Spring. Nearly 100 wells were sunk and oil was found at about 100 feet depth. It is reported that the first well yielded nearly 300 barrels of oil the first day, and did not flow after that. But few of these wells flowed. A pipe line 14 miles long was laid to the railroad, and a 2,000-barrel storage tank was erected, but on examination the product was declared unsuited for the manufacture of illuminating oil, and the whole project was abandoned.

Oil was discovered at Corsicana, some time prior to 1894, by Major Alex. Beaton, in sinking an artesian well. In 1894 the city sunk an artesian well for a water supply for the inhabitants, and at 1,027 feet struck a vein of oil. This oil was cased off and the boring continued to 2,470 feet, when a good flow of warm water was reached. The oil, however, soon made its appearance through the soil, on the ontside of the casing, and has flowed more or less ever since. With this evidence of oil, a company was formed and wells were sunk. Mr. Ralph Beaton, manager of this company, had this to say last December:

"Our wells vary in depth from 1,000 to 1,040 feet, to the top of the oil bearing sand, and the sand is from 10 to 40 feet thick. The oil rock is very regular and dips to the southeast about one foot to the 100 feet. After oil is struck it is usually about 24 hours before it reaches the surface. The oil is forced up by gas, and sometimes it throws the oil 100 feet clear of the ground.

"The oil flows by heads of from 5 to 10 minutes duration. The flow seems to have a diurnal period commencing stronger about 4 P. M., gradually increasing up to midnight, and diminishing until 9 A. M. The wells vary from 10 to 30 barrels per day. Some of the wells on the

outskirts of the field have fallen off considerably, but those in the middle of the known field hold up well. Our No. 6 is now 11 months old, and flows from 23 to 27 barrels daily, the same as when fresh. There are now 60 wells and some not over 200 feet apart, and still there seems to be but little falling off in the flow of the individual well."

In January, 1898, there were 65 flowing wells, and 6 dry holes had been dug—a fraction less than 10 per cent. The total production of these wells was about 900 barrels per day. The known field at this time was about 2¼ miles by ¼ of a mile, and it lays northeast and southwest, about 20° to 22°.

The elevation of Corsicana is about 800 feet above the sea, therefore the oil bearing strata is something like 200 feet below the sea. The drilling is entirely through Ponderoso marl, and the oil bearing rock is a soft gray shale, and can hardly be called a sand.

The most of the oil consumed up to this time has been used as fuel. The regular price has been 50 cents per barrel until last January; a large storage tank was then completed, and all oil was delivered to this tank, and the price immediately advanced to 70 cents per barrel. Of course all contracts existing at the time were respected. April 10, the storage capacity of the pipe line company is 60,000 barrels, and a refinery is talked of by the owners of the tanks.

As a gas oil it gives very satisfactory results, our yield being from 5.50 to 5.75 candles per gallon of oil used, and as high as 32 candle power gas has been made, although the sendout is kept at about 20 candle power.

The Houston plant gets as good results from the oil as it did from the oils obtained from the northern fields.

The following fractional distillation was made of the oil from the first well sunk in 1894. As it is near the edge of the field, and the distillation is different from a well near the center of the field, a comparison may be of interest.

Corsicana Oil from the First Well Sunk by the City.—Fractional distillation, by Prof. H. H. Harrington, College Station, Texas.

Specific gravity at 62° = 0.821; began to boil at 176°.

Between	176	and	194°	gave off	16.4	per cent.	of its volume.
"	194	"	230°	"	7.8	"	" "
"	230	"	284°	"	10.4	"	" "
"	284	"	338°	"	9.2	"	" "
"	338	"	392°	"	3.6	"	" "
"	392	"	536°	"	16.0	"	" "
"	536	"	581°	"	11.2	"	" "
Above	581				15.8	"	" "
Total volatile matter					90.4	per cent.	
Coke residue					9.6	"	
					100.0		

Corsicana Oil from a Well Near Center of the Field.—Fractional distillation made by Mr. E. H. Ernshaw, Chemist for the U. G. I. Company. Oil very dark brown and opaque, but thin and fluid at 60° F.

Specific gravity at 60° F. = 39½° B. = 0.8292.

Temperature. Deg. F.	Per Cent. by Volume.	Per Cent. by Wt.	Degrees Baume.	Sp. Gr. at 60° F.	Color, Etc.
A-130 to 200	2.80	2.24	80.0	0.6653	Colorless.
B-200 to 250	5.10	4.31	69.5	0.7017	"
C-250 to 300	7.60	6.69	61.75	0.7302	"
D-300 to 350	8.20	7.44	56.00	0.7527	"
E-350 to 400	9.40	8.75	51.25	0.7718	"
F-400 to 450	7.40	7.07	46.75	0.7920	"
G-450 to 500	8.30	8.09	43.00	0.8088	"
H-500 to 550	6.45	6.43	39.50	0.8260	Very faint yellow.
I -550 to 600	7.75	7.85	36.50	0.8404	"
J -600 to 650	14.95	15.43	33.50	0.8555	Yellow.
K-650 to 665	17.25	18.07	31.00	0.8687	Deep reddish yellow.
L-over 650	1.30	1.41	26.00	0.8972	Deep red solid.
M-over 650	1.40	1.63	14.50	0.9699	Dark red brown-solid.
Residue....	..	2.63	..	..	
Total....	97.90	98.04	..	..	

Summary of the Foregoing Distillation.

Temperature, Fahrenheit.	Per Cent. by Volume.	Per Cent. by Weight.	Baume.	Specific Gravity.
130 to 200°.....	2.80	2.24	80.00	0.6653
200 to 300°.....	12.70	11.00	64.75	0.7190
300 to 400°.....	17.60	16.19	53.50	0.7680
400 to 500°.....	15.70	15.16	44.75	0.8012
500 to 600°.....	14.20	14.28	37.75	0.8345
600 to 665°.....	32.20	33.50	32.25	0.8627
Above 665°.....	2.70	3 04	19.75	0.9350
Residue.....	....	2.63	....	....
Total.....	97.90	98.04	....	....

In conclusion I desire to acknowledge my indebtedness to all those gentlemen who have contributed to the information compiled herein.

Discussion.

Mr. D. McDonald—On page 8 of this paper you give an analysis of natural gas, and I think it is incorrect. I think that anyone who made the analysis as to the quantities of hydrogen and marsh gas contained would get results very different from those there stated. I am told that there is no free hydrogen in it. The percentage of marsh given is very much too small; it ought to be 97 per cent. instead of 67 per cent.

Mr. T. D. Miller—Prof. Harrington is responsible for that analysis.

Mr. McDonald—I would not attempt to state how much it is, but I believe that a correct analysis will show that natural gas has 87 per cent. of marsh gas.

Mr. T. D. Miller—I have here a sample of the oil which can be seen by anyone interested in it.

Mr. Jenkins—There is very little discussion to be made on this paper now. I think you had better wait until Mr. Miller has more to say with regard to the oil. I move a vote of thanks to Mr. Miller for his paper. (Carried.)

The Association then took a recess until 7:30 P.M.

First Day, Evening Session.

The evening session was called to order by the President, who announced that the special business in hand was the election of officers for the ensuing year.

Election of Officers.

The nominations having been duly made, and the requisite ballots having been taken, President Lynn declared that the officers chosen were:

President—Mr. Geo. T. Thompson, New York city.
First Vice-President—Mr. I. C. Copley, Aurora, Ills.
Second Vice-President—Mr. Wm. McDonald, Albany, N.Y.
Secretary-Treasurer—Mr. James W. Dunbar, New Albany, Ind.
Editor Wrinkle Department—Mr. E. H. Jenkins, Buffalo, N. Y.
Directors (to serve two years)—Messrs. Eugene Printz, T. D. Miller, Howard C. Slater and Irvin Butterworth; to serve out the unexpired term of Mr. Wm. McDonald, Mr. James Forbes.

The officers elect having suitably acknowledged the honors accorded them, an adjournment until the following morning was ordered.

Second Day, Morning Session, May 19.

The proceedings of the second day were commenced at 9:30 A.M. The President introduced Mr. Bankson Taylor, of St. Paul, Minn., who read the following paper on an

IGNITION OF GAS BY STATIC ELECTRICITY.

Mr. President and Gentlemen of the Western Gas Association: When I related the following incident some time ago to Mr. George Treadway Thompson, he told me he thought the matter might be of interest to you, and I will endeavor to give you as accurate an account of the affair as possible.

Our Harris-Griffin meter having been out of order for some time, and as I suspected that gas was being passed without registering, I bye-passed the meter, opened it up, and, having discovered the trouble, remedied it. The drum had been slipping on the shaft, and had slipped forward so that the internal galvanized gooseneck had been cut, and water was running back through the inlet pipe to the center seal.

I wished to test the accuracy of the water line after the repairs were made, and for that purpose I obtained a 150 light meter. This I proposed connecting on to the 16-inch outlet of the Harris-Griffin meter on both sides of the outlet valve. There happened to be a three-quarter hole tapped into the outlet pipe above the valve, and I again bye-passed the meter, and proceeded to enlarge this hole to a 2-inch, intending to connect up to the dry meter inlet. While in the retort house I was sent for by the man who was doing this work, and when I reached him he said that he had had a slight "shot" or explosion within the 16-inch main, and he wished me to stay with him and see if everything was being done properly. Everything did seem to be all right, and I could not account for the "shot," excepting on the theory that his tools had slipped, causing a spark which ignited the gas. I cracked the 16-inch valve so as to have a slight pressure from the holder, soaped and greased the reamer, and we went ahead again, this time reaming out the hole successfully to 2-inch size. A 2-inch tap was placed in the hole, and as the workmen placed the wrench on the tap the gas took fire again, scorching the men slightly, and continuing to blaze from the

2-inch hole. This was better than a shot inside the pipe, and we had no difficulty in putting it out. It was, however, more difficult to explain the matter, and more puzzling than the first incident. While the shot might have been caused by a spark from the reamer or file, at the time of the second occurrence I was present myself, and I was sure that there could have been no spark from the tap. No pressure had been put on the wrench, and there were no lights in the room.

After considerable investigation, I discovered the cause of our trouble. Within about 3 feet of the 16-inch pipe, and within about 4 feet of the 2-inch hole, runs the 4 inch belt of a small Buckeye engine. This engine runs the 16 inch exhauster, which draws the water gas from the generator and relief holders. Frequently we run from 50,000 to 60,000 per hour through this exhauster, at which times the engine goes very rapidly. This engine was in service at the time, and was pulling at the rate of 50,000 per hour, and the conclusion I came to was that sufficient static electricity was generated to pass through the man at work and reach his reamer, and later his tap. Under the proper conditions this caused a spark, slight, but sufficient to ignite the gas, causing in the first instance, when all the valves were closed, a shot within the pipe, and afterward, when the pressure was on, a flame from the orifice. We immediately shut down the engine, went ahead, and had no further trouble.

Prior to this we had, for some days, our Harris-Griffin meter out of use, with a portion of the front off, and the inlet pipe removed. It was of course full of gas when we shut it down, and during the time we were at work upon it a quantity of air mixed with this gas and gradually dissipated the latter. These conditions continued for some days, during all of which time the small Buckeye engine and water gas exhauster were running at full speed. Men were at work on the meter. The mixture of gas and air within the meter was very possibly of the proper proportions to be explosive, and it seems to me a very fortunate thing in the light of after events that no serious accident occurred at that time. Had an explosion occurred then, it might have caused loss of life and considerable damage, and it would without doubt have been attributed to the carelessness of someone. I have no doubt that many of you gentlemen have had experiences similar to the above, and been guided in your future conduct accordingly; and it has seemed to me that in cases of the opening up, cleaning and repairing of all gas apparatus of whatever kind (scrubbers, condensers or meters), that too great care cannot be exercised in guarding against rapidly running machinery. I feel as though we, personally, had kept out of trouble through good luck more than anything else, and I for one will in the future place rapid running belts in the same category with lighted gas jets.

Discussion.

The President—I understand that Mr. Shelton has had an experience similar to that described by Mr. Taylor.

Mr. Shelton—That is a misapprehension. I have never had electrical developments that way. I think, however, that the paper of Mr. Taylor very nicely illustrates the care necessary in working around gas apparatus, especially when it is in a partly completed condition only, in order to guard against possible accidents which may be very serious in their results. To illustrate, I might cite an incident that I once had myself in connection with a station meter, though not due to electricity. We had turned the gas off, and were drilling a hole in the back of the meter, the water overflow originally having been in a wrong position. The meter was connected with a live main, and gas was going through the bye-pass. The workman drilled a hole three-quarters of the way through, and then started to chip out what was left with a hammer and chisel. He made about four chips, and then made about 4 feet in a horizontal direction! It seems that a spark had been struck between the steel of the chisel and the sand on the inside of the casting which formed the back head of the meter. The meter simply blew up. The bye-pass valves evidently were not absolutely tight, and the few feet of gas leaking through into the interior of the drum were sufficient to form an explosive mixture, and the spark made caused it to blow up very promptly. While not pertinent to the question of static elecricity, I do think the incident illustrates, as Mr. Taylor's paper does, the extreme care necessary to be exercised in order to be on the right and safe side when working around the chambers of gas machinery which might by any possibility contain an explosive mixture. I think Mr. Taylor's paper a very interesting one as pointing out something which is practically new. I have attended this Association for many years, but have never before heard or thought of the point raised by Mr. Taylor, that electricity may be derived from a running band and become a source of danger. Every such new point is distinctly valuable to us, and Mr. Taylor has added to our knowledge by his paper.

Mr. Egner—I have had experience similar to that reported in the paper. We had an alternating dynamo, very near to an arc dynamo, in the works of which I had charge, and the man who attended the dynamos often got severe shocks. We could not account for them. I remembered some of my old gas house experience and it came to my aid. In former days there was a large exhauster belt in use in the works of the New York Gas Light Company, and we used to take a soda water bottle and fill it about half full of borings, and then put an iron wire through the cork, and a little brass or other metal ball on top of that; we would hold that alongside of the exhauster belt for a while and then carry it to a friend and ask him to take hold of the bottle. He would take hold of it generally with his two hands, but would drop it immediately, for he got quite a shock from the electricity stored up in that improvised Leyden jar. Remembering this, I expected that static electricity was causing the trouble with our dynamo. As the shock sometimes would knock a man down, the men became cautious and would not go near that dynamo. The belt which was driving the alternating machine ran very close to the arc dynamo. We took a ½-inch pipe, fastened a piece of sheet copper on top, put it near the edge of the belt, and then drove the pipe down into the ground, through the floor of the house, and that plan removed all the trouble. In other words, this pipe became a conductor of the static electricity which was generated by that belt. It is plain that the danger is there, and, as Mr. Taylor says, we will have to look out for it.

Mr. W. McDonald—The Secretary asked me to say a word on this matter, but Mr. Shelton has said what I would like to have said. I am very glad this matter has been brought up. I think every meter manufacturer is familiar with it, and although the subject has never been brought before a meeting (in fact, very little has been said about it anywhere), yet we all know there is great danger from this point. I want to take exception to one statement in Mr. Taylor's paper. He spoke of a rapidly running belt. You cannot tell how rapidly a belt has got to run to produce static electricity. Sometimes quite a slow running belt, in certain locations, will throw off electricity very freely. Therefore, I think it quite important that everyone should appreciate the fact that a belt running in a place where any gas apparatus is opened is a very dangerous thing. The belt might better be stopped; that is the best way to be sure of avoiding danger. I want to say further that no other piece of gas apparatus is so dangerous as the station meter, or that is so likely to hold gas which was supposed to have been expelled. The partitions of the drum hold gas for many days, sometimes for weeks, after it is all supposed to be out; and, therefore, it is a dangerous thing to bring any fire in contact with it unless it has first been steamed out. When this is done we may know that it is absolutely safe. I say this because there is a good deal of tendency on the part of people around gas works to fix station meters themselves whenever there is anything the matter with them. That is all right if they are careful, but they want to be warned of the danger there is in handling the station meter because of liability to explosions.

Mr. Faben—Mr. McDonald has referred to the speed of a belt as not necessarily a fast belt or a slow one in the generation of the current. Is not this so-called static electricity caused by the *slipping* of the belt on the pulley? If there is no slipping on the pulley, there will be no static electricity. Some of the gentlemen here who know more about this subject might elaborate that point.

Mr. Witherby—It is not caused by friction on the pulley, so far as I can understand, but by the friction of the atmosphere—the same as with a static electric machine.

Mr. Faben—Then I would regard that as a question of location, so that on extremely dry earth that would be true, but would rarely occur on low ground.

Mr. T. D. Miller—I attended the Denver Exposition the year it opened, and as I passed under the belt of the engine from the main shaft I noticed a piece of rubber belt lying on the floor. I stepped upon it, and while standing on it put up my hand to feel the current of air, and immediately got a spider web sensation on my fingers. I recognized what it was, and presently touched someone's face and gave them quite a shock. The atmosphere was dry, and there was absolutely no slipping of the belt.

Mr. Faben—I think that ground composed of sand and gravel, and where there is no moisture, would have a tendency to produce that, if there was no slipping of the belt; but I think it is more common where there is some slipping.

Mr. T. D. Miller—In the plant of a certain electric company I know of there are two 4-foot belts, and they had to put up wires with points very close to the belt to take off the current. These works are located in a river bottom, and there is no reason in the world why the current,

if developed from slipping of the belt, should not go right to the ground through the main pulley. The grounding was done in order to take away the danger of shock to the men passing near the belt.

Mr. Faben—Is that not a dry situation?

Mr. T. D. Miller—No; it is right in the river bottom, and they have had to encase the lower half of their main pulleys, which are very large, with sheet iron, to keep the river from coming up and wetting the belt.

Mr. Witherby—It is not so much due to the slipping of the belt on the drum as to the humidity of the atmosphere. In damp, foggy mornings or evenings the static electricity would be hardly noticeable, but on a cold, dry night we have sometimes found it sufficient to almost knock one down.

Mr. W. McDonald—My experience leads me to the same conclusion. In the Capitol at Albany, N. Y., in the hot air chamber is an 18 inch belt—the floor is of cement (which conducts electricity very freely)—and it has been noticed that if persons whose hair is perfectly dry stand in that chamber under the belt, immediately their hair will stand up, and there will be a current of electricity.

On motion of T. D. Miller, the thanks of the Association were voted to Mr. Taylor for his paper.

Next Place of Meeting.

The President—I understand that Mr. Howard has been delegated to serve as Chairman of the Committee on next place of meeting. Is Mr. Howard ready to report?

Mr. Howard—Although not named as the Chairman of the Committee, I will state that Milwaukee, Wis., has been selected.

On motion of Mr. Jenkins, the report was received and adopted.

Report of Committee on President's Address.

Mr. D. McDonald read the following report submitted by the Committee on President's address:

To the Western Gas Association: The Committee on President's Address beg leave to report that we have given to that paper the consideration which its strength and general good judgment entitle it, and while we commend the whole document to the careful consideration of our members, we especially call attention to the following features:

The statement as to the increasing use of incandescent gas burners in street lighting is very encouraging, and should prompt our members to continue this invasion of what has now become the enemy's country.

While your Committee do not agree that the gas is likely to have the same temperature at the consumers' meters that it has at the works, and that, therefore, temperature does not exercise a material influence on the question of leakage, we heartily indorse the necessity of keeping mains, services and meters in as near a perfect condition as possible, so that the leakage may be reduced to a minimum.

With regard to fuel gas, we indorse all that the President has said, but we remind the members that the use of gas for fuel already furnishes a profitable outlet for a large part of our product, while it holds out the promise of a very much larger expansion in the future.

We believe the suggestions concerning coal tar are both timely and eminently practical, and recommend them to the serious consideration of the members of this Association.

With regard to the suggestion for extending our membership, we think the plan an excellent one; at the same time, we think that sight should not be lost of the fact that the quality of our membership is even more important than its size, and care should be taken to seek for members only such men as will be a credit to the Association, and be able to profit by its meetings.

Concerning the eloquent and patriotic remarks with which the President has closed his address, we are glad of this new proof that the odors of hydrocarbon vapors stimulate, rather than smother, the fires of patriotism; at the same time we feel that it would seem as if we were not duly grateful to Divine Providence if we failed to congratulate the members of this Association on the fact that their works are indeed *Western*, and hence out of reach of the longest gun that floats on the ocean. (Mr. Miller of this Committee dissents from this paragraph, as his works have thoughtlessly located themselves close to tidewater, where the tall holders present a tempting mark for target practice. He asks suggestions of some quick method by which a shell hole in a gasholder can be stopped, without serious risk of getting a similar hole in the Superintendent.) All of which is respectfully submitted.

Donald McDonald,
Frederick Egner,
Alten S. Miller,
} Committee.

On motion of Mr. Miller the report was received and filed.

Disposing of the Amendment to the Costitution.

The President—We will now proceed to vote on the proposal to amend the Constitution, as per the articles submitted in the report of the Board of Directors yesterday morning. What is your pleasure thereon?

Mr. Egner moved the adoption of the amendment proposed, which motion was seconded by Mr. Thompson.

The President—Is there any discussion on the question?

The Secretary—I wish to explain that the only change proposed is one which will give to Associate members the right to vote. Now they have not that right. But they will have the right to hold office.

Mr. Forstall—I think the Secretary is mistaken. The change proposed really does away with the distinction as it now exits, between Active and Associate members. The mere right of holding office in an Association of this kind does not amount to anything at all. We have three officers, and there are some 300 members; so that only one per cent. of members hold office, and a member might live to be 100 years old and yet not have any great chance of holding office. The essence of distinction between Active and Associate membership in all Associations has been the right to vote. Active members have the right to vote, while Associate members have not that right. I suppose it is still an open question whether it is advisable to divide the membership in Associations of this character into Active and Associate. Personally I think it is desirable; and I think that having done it in this Association we should not now go back and do away entirely with the distinction by conferring the right to vote on our Associate members. If we are ready to do that, let us do away with the distinction entirely and have only Active members and Honorary members, and have the Associate members done away with by transferring them all to Active membership.

The Secretary—I am certainly not mistaken in the purport of these amendments to the Constitution. I am merely stating what it is proposed to accomplish with them.

The President put the question and declared that the amendments proposed were adopted.

Letters of Regret.

The Secretary announced that he had received letters from the following named gentlemen expressing their regret at not being able to attend the meeting: Fred S. Benson, W. H. Bradley, Samuel T. Bodine, Eugene Vanderpool, P. M. Doan, Charles W. De Armitt, James H. Armington, John S. Chambers, James G. Raynor, W. H. Odiorne, William R. Beal, W. H. Pearson and I. C. Copley.

ROLL CALL.

The following members responded to the roll call:

Honorary.

Slater, A. B., Providence, R. I.
Harbison, J. P., Hartford, Conn.
White, W. H., New York City.
Humphreys, C. J. R., Lawrence, Mass.
Leach, H. B., Taunton, Mass.
Howard, J. B., Galena, Ills.

Active.

Barret, A. H., Louisville, Ky.	Ellison, B. F., St. Paul, Minn.
Baxter, I. C., Detroit, Mich.	Faben, C. R., Jr., Toledo, O.
Blodget, C. W. Brooklyn, N. Y.	Ferrier, J., Columbus, Ga.
Bolcom, H. C., Winona, Minn.	Forbes, J., Chattanooga, Tenn.
Branch, A. H., Denver, Col.	Forstall, A. E., Montclair, N. J.
Brown, J. S., Danville, Ky.	Fullerton, G., Jr., Buffalo, N. Y.
Butterworth, I., Columbus, O.	Glass, Sheldon J., Milwaukee, Wis.
Byers, C. A., Toledo, O.	Harris, W. H., Mansfield, O.
Callender, E P., New York City.	Harper, G. H., Altoona, Pa.
Cathels, E., Hamilton, Ont.	Holmes, B. P., Youngstown, O.
Chollar, B. E., St. Louis, Mo.	Humphreys, A. C., New York City.
Christie, W. H, Corning, N. Y.	Jenkins, E. H., Buffalo, N. Y.
Corscot, J., Madison, Wis.	Jones, T. C., Delaware, O.
Cowdery, E. G., Milwaukee, Wis.	Knight, C. S., Fort Wayne, Ind.
Cowdrey, R. E., Topeka, Kas.	Knight, J. J., Kalamazoo, Mich.
Cole, C. H., Lima, O.	Lathrop, A. P., Columbus, O.
Cressler, A. D., Fort Wayne, Ind.	Littleton, A. W., Quincy, Ills.
Croul, J., Detroit, Mich.	Lynn, J. R., Port Huron, Mich.
Douglas, H. W., Ann Arbor, Mich.	Lynn, J. T., Detroit, Mich.
Dunbar, J. W., New Albany, Ind.	McAdams, B., Michigan City, Ind.
Dixon, J. A., East Orange, N. J.	McClary, N. A., Chicago, Ills.
Eaton, W. M., Jackson, Mich.	McDonald, W., Albany, N. Y.
Egner, F., Norfolk, Va.	McDonald, D., Louisville, Ky.
Elbert, V. L., Menominee, Mich.	McIlhenny, J. D., Phila., Pa.

Miller, A. S., New York City.
Miller, T. D., Dallas, Tex.
Mitchell, K. M., St. Joseph, Mo.
Montgomery, J., Sedalia, Mo.
Morgans, W. H., Pontiac, Mich.
Murdock, G. T., Elkhart, Ind.
Murdock, J. W., Ottawa, Ills.
Neeley, J. D. S., Lima, O.
O'Malley, P., Aurora, Ills.
Owens, C. J., St. Louis, Mo.
Perkins, B. W., South Bend, Ind.
Powell, W. E., Logansport, Ind.
Pratt, E. G., Des Moines, Iowa.
Printz, E., Zanesville, O.
Ramsdell, G. G., Phila., Pa.
Raynor, C. H., Adrian, Mich.
Runner, Z. T. F., Freeport, Ills.
Salter, J., Covington, Ky.
Sellers. W. B., Covington, Ky.
Shelton, F. H., Phila., Pa.
Slater, H. C., Milwaukee, Wis.
Somerville, J., Indianapolis, Ind.
Starr, J. M., Richmond, Ind.
Steinwedell, W., Quincy, Ills.
Summers, F. W., Hornellsville, N.Y.
Tayler, G. H., Warren, O.
Thompson, G. T., New York City.
Thwing, O. O., St. Louis, Mo.
Wallbridge, H. D., Detroit, Mich.
Wallace, W., Lafayette, Ind.
Warmington, D. R., Cleveland, O.
Welch, C. H., Athens, O.
Woods, G. E., New York City.
Young, P., Buffalo, N. Y.

Associate.

Bredel, F., Milwaukee, Wis.
Carpenter, H. A., Allegheny, Pa.
Clark, G. M., Chicago, Ills.
Collins, D. J., Phila., Pa.
Corbus, F. G., Chicago, Ills.
Dell, J., St. Louis, Mo.
Dwyer, F. J., Detroit, Mich.
Eaton, A. B., Chicago, Ills.
Eilbeck, A. B., Phila., Pa.
Goodwin, W.W., Phila., Pa.
Guldlin, O. N., Fort Wayne, Ind.
Harper, H. D., Chicago, Ills.
Hayward, S. F., New York City.
Henderson, E. H., Pittsburgh, Pa.
Higgins, C. M., New York City.
Jacobs, C. H., Detroit, Mich.
Manser, J. M., Royersford, Pa.
Moses, F. D., Trenton, N. J.
Osius, G., Detroit, Mich.
Persons, F. R., Toledo, O.
Prendergast, D. J., Phila., Pa.
Roots, D. T., Connersville, Ind.
Roper, G. D., Rockford, Ills.
Russell, D. R., St. Louis, Mo.
Rue, G. W., Chicago, Ills.
Stacey, J. E., Cincinnati, O.
Stratton, S. S., Chicago, Ills.
Van Wie, E. G., Detroit, Mich.
Waugh, F. K., Chicago, Ills.
Weber, O. B., New York City.
Wells, F. K., Chicago, Ills.
Whirle, J. J., Chicago, Ills.
Wickham, L., St. Louis, Mo.

Report of Committee on Memorials.

Mr. I. C. Baxter read the following report from the Committee on Memorials:

Whereas it has pleased an Omnipotent Creator to remove from our midst during the past year three worthy members of this Association, as follows:

George S. Harris, late Superintendent of the Mansfield (Ohio) Gas Light Company, who departed this life June 14th, 1897. For many years he was actively engaged in the gas industry, and was recognized as an able business man and an excellent gentleman.

A. E. Smythe, late Secretary of the Mutual Fuel Gas Company, of Chicago, Ills., who died July 9th, 1897. While not connected with us for so long a term of years, he had made an impression upon all who knew him in the walks of life. Genial and companionable, his presence will be sadly missed by those who knew him best; and

J. D. Thompson, late Treasurer of the Laclede Gas Light Company, of St. Louis, Mo., who died February 15th, 1898. Mr. Thompson had been, since the early years of this Association, one of its most energetic and willing supporters. A kind husband, a dutiful father and a firm friend, he held the respect of all in the community where he made his home, and was highly regarded by those who knew him in his business life.

Be it Resolved, That in the death of these members, this Association feels that it has sustained an inestimable loss, and that while we bow our heads in humble submission to the Divine decree, we extend our heartfelt sympathy to their families and friends.

Be it also Resolved, That these resolutions be spread upon the minutes of the Western Gas Association.

Isaac C. Baxter,
Geo. G. Ramsdell,
C. W. Blodget. } Committee.

On motion of Mr. W. McDonald, seconded by Mr. F. Egner, the report was received and adopted by a rising vote; and the Secretary was instructed to send a copy thereof to the families of the deceased members.

Mr. O. O. Thwing, of St. Louis, Mo., read the following paper on

METHODS OF ESTIMATING THE VALUE OF GAS LIQUORS.

The volumetric test of ammoniacal liquors with which this paper deals is dependent upon the law of definite proportions, in consequence of which, when two or more substances are combined to form a new substance, the combining substances must be present in certain fixed and unalterable proportions by weight, as laid down by this law. Thus we know that 49 parts by weight of pure sulphuric acid will completely neutralize 17 parts, by weight, of pure ammonia, forming 66 parts, by weight, of a new substance that is neither acid nor alkali, has none of the peculiar properties of either of its constituents, but is a neutral salt called sulphate of ammonia. Knowing this, if we should find that it required 49 ounces of pure sulphuric acid to totally neutralize the ammonia in a gallon of liquor, we would know that the gallon had contained 17 ounces of ammonia, and that it now contained 66 ounces of sulphate of ammonia in solution. If it required more or less of the acid to accomplish the same purpose, the proportion of ammonia would remain the same; viz., 17-49 of the weight of the acid used.

Ammoniacal liquors are valued and sold in several different ways. Contracts are usually made at a stated sum per 100 ounces, per pound of ammonia, or per pound of 20 per cent. liquor. The amount is designated in ounces per gallon, pounds per gallon, or per cent. by weight. In all references to gallons in this paper, the United States gallon of 231 cubic inches is meant.

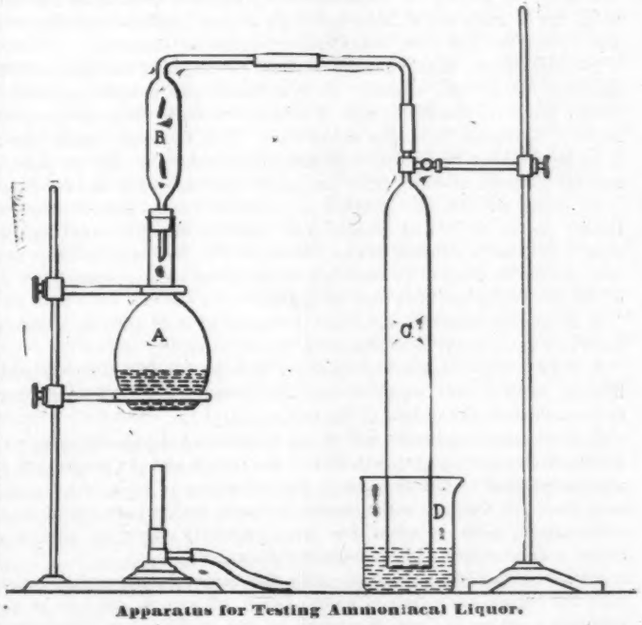
When ammoniacal liquor is designated as being of "such ounce strength" or so many ounces to the gallon," it is not meant that there are that many ounces of ammonia to the gallon of liquor, but that it would require that many ounces of pure sulphuric acid to neutralize the ammonia in the gallon. Thus if we refer to a sample of liquor as being 10-ounce strength or running 10 ounces to the gallon, we mean that it would take 10 ounces of sulphuric acid to neutralize the ammonia contained in a gallon of the liquor, and that the amount by weight of ammonia would be, as shown above, 17-49 of 10 ounces, or 3.47 ounces per gallon.

"Pounds of ammonia" means actual avoirdupois pounds of absolute ammonia, whether your liquor contains 2 pounds or .02 pounds to the gallon.

"Per cent. of ammonia" means also what its name implies. In 20 per cent. liquor one-fifth of the total weight of the liquor is ammonia. As stated before, this term is generally used in contracts for concentrated liquor.

The first step in estimating the value of ammoniacal liquors is to ascertain the ounce strength. The other valuations are computed from this. To make this determination the following will be required:

Normal volumetric solutions of sulphuric acid and carbonate of soda, some caustic soda or potash, indicator solution, two 50 c.c. volume pipettes, two 50 c.c. graduated burettes, with stands, connections and pinchcocks, a nest of Griffin-lipped beakers, from No. 1 to No. 8, and the distilling apparatus of which a sketch is given with this paper.



Apparatus for Testing Ammoniacal Liquor.

This consists of a boiling flask *A*, with ring stand, a pipette *B*, with the long leg bent at right angles, and the end of the short leg ground down to a point as shown, the contracted end of the long leg being filed off. This arrangement is to prevent any of the solution in *A* from spattering over into *D*. A long funnel tube *C*, with suitable stand and clamp for

supporting it, and a No. 6 or 7 Griffin beaker, *D*. If it is required to make one's own solutions a good chemical balance, with a set of metric weights, and two or three 1,000 c.c. liter flasks, will also be required.

An indicator is a substance that is of one color when in an acid solution and of another when in an alkaline one, and is, therefore, used to determine when a solution has been completely neutralized. Litmus is red when acid and blue when alkaline. Methyl orange is pink when acid and yellow when alkaline. Phenolphthalein is colorless when acid and red when alkaline. Cochineal is a straw color when acid, a wine color when neutral and purple when alkaline. Of these indicators, the best to use in testing ammonia is cochineal. Phenolphthalein and litmus are affected by carbonic acid, and the first is also decomposed, to a certain extent, by ammonia. Methyl orange has a very gradual and slight color change when passing from an acid to an alkaline condition, and the exact point of neutrality is exceedingly hard to distinguish. None of the three has a distinctive color for the neutral condition. Cochineal is not subject to any of these objections.

To make the cochineal indicator, get the ordinary "bugs" and pulverize a small handful in a mortar. When powdered put into a filter paper, in a funnel, and percolate with a "tincture solution" of half alcohol and half water. This will make enough strong solution to fill an 8 ounce bottle, and should be kept for convenience in a bottle with a perforated cork in which a glass tube, with the outside end drawn down, has been inserted. The indicator can then be shaken or squirted into the solution to be titrated, and a very few drops are all that is required in the operation. As said before, it gives to the acid solution a straw color, to the neutral a wine color and to the alkaline a deep purple.

The normal volumetric solutions of sulphuric acid and of carbonate of soda can be obtained from almost any large chemical house, but where the appliances are at hand, it is much more satisfactory to make them, or at least to check up the solutions purchased. Standard or normal sulphuric acid contains 49 grammes of pure sulphuric acid per liter of solution in water. Normal carbonate of soda contains 53 grammes of pure carbonate of soda per liter of solution.

The normal solution of carbonate of soda is prepared by weighing 53 grammes of the candle power carbonate into enough pure, distilled water to make a liter of solution at 60° F. It is well to heat the soda for 10 to 15 minutes before weighing in a platinum crucible, keeping the bottom of the crucible at a dull, red heat, and afterward cooling in a desiccator in order to drive off any moisture that might be present. If the soda is fresh, however, this is hardly necessary. Personally, I prefer a semi-normal solution of 26½ grammes of the carbonate of soda to the liter, of which it requires two volumes to neutralize one of the normal acid. It should be explained here that the normal or standard solutions of acids and alkalies are made so that they will combine with and neutralize each other completely, volume for volume.

Normal sulphuric acid cannot be made by weighing the acid into the solution for several reasons. It is a liquid and a burning acid, its purity is always doubtful, and it absorbs moisture from the air very rapidly, changing its weight at the time. It is, therefore, made first to a certain extent by guess, and afterward tested by one or more of several methods, and any error that may exist discovered and corrected.

To make the normal solution of sulphuric acid, take 26.7 c.c. of candle power acid, 1.84 gravity, and place in enough pure, distilled water, to make a solution of one liter at 60° F. This will be very near to a normal solution. To ascertain its degree of correctness any or all of the following methods may be applied.

1. It may be titrated against the carbonate of soda solution which, if carefully made from pure materials, will be correct.

2. It may be precipitated by means of barium chloride, the precipitate filtered, ignited and weighed, and the proportion of sulphuric acid calculated from the weight of the barium sulphate.

3. Ammonium chloride, which can be obtained chemically pure, can be distilled in the apparatus shown in the sketch and the proportion of acid ascertained by titration, as in the estimation of ammonia detailed later on. The first test is the easiest, shortest, and, where the normal carbonate of soda solution has been carefully made of pure material, will be correct. It is made as follows:

Fill one of the 50 c.c. burettes with the acid solution and the other with the normal carbonate of soda. Draw off exactly 25 c.c. of the acid into a beaker and put in enough of the cochineal to thoroughly color it. It will be a clear straw color. Place the beaker below the other burette and carefully drop the standard carbonate of soda into it, stirring it constantly with a glass rod or spatula, until the straw color has been succeded by the wine color. It is well for the beginner to have another beaker at hand containing pure water, colored by cochineal, in order that he may ascertain when the solution has reached the neutral point, by comparison.

If it takes exactly 25 c.c. of the normal soda solution to neutralize the 25 c.c. of acid, then the acid is normal and contains exactly 49 grammes of sulphuric acid to the liter, or 6.54 ounces to the gallon. If it requires more than 25 c.c. of the soda the acid is too strong, and if it requires less it is too weak. When the difference is not very much it is well to let it go, making a note of the corrected ounce strength, and using it instead of the regular 6.54 in the calculations. Thus, if it takes 25½ c.c. of soda to neutralize the acid, we know that the solution is 2 per cent. strong, and is, therefore, 6.67 ounces to the gallon. In testing with this acid we would therefore use 6.67 in the equations instead of 6.54, as is given in the example later on.

If it is desired to make the acid absolutely normal, the addition of 2 per cent. more water will produce the result. It is the practice, in making large quantities of normal acid, to use a known weight of water, make the solution purposely a little strong, ascertain its strength, and then add enough of water by weight to make it normal.

The second test, or check of the acid, by precipitation as sulphate of barium, requires considerable skill in manipulation and a rather better equipped laboratory than will be found in most gas works. Therefore, it will not be given in detail.

For the third test, take 2.673 grammes of chloride of ammonium, and distil with about 10 grammes of caustic soda or potash, into 55 c.c. of the acid solution. Titrate to ascertain how much acid remains. The ammonia from the above amount of chloride would neutralize exactly 50 c.c. of normal acid.

In all these and the following operations, great care should be taken to prevent error. Instruments should be kept clean and, as far as possible, used each time for the same purpose. One burette should always be used for the acid solutions, and another one for the alkaline. A good way to distinguish them is to scratch the instruments, used with acids, slightly with a file.

Before making a test of gas liquor it is necessary to know approximately how strong it is. This can be ascertained by the Twaddel hydrometer, allowing 2-ounce strength for each degree at 60° F., and adding one ounce to the result, for safety. If your liquor shows 3° Twaddell, assume that it is 7 ounce liquor. Another plan is to take 10 c.c. of the liquor to be tested, dilute with about 10 times its volume of water, color with cochineal and drop normal acid into it until the color changes to the acid tint. This will give the amount of acid required for each 10 c.c. of liquor used in the test, but an excess of 5 or 10 c.c. should be added for the first test.

Suppose that we have made the preliminary test, that the liquor shows 3° Twaddel, and required 10.2 c.c. of acid to neutralize 10 c.c. We will make the test with 50 c.c. of liquor. We, therefore, first put into the beaker *D*, five times 10 2 c.c. or 51 c.c., plus 5 c.c. for safety, equals 56 c.c. of normal acid and add enough pure water to bring the solution about 2 inches high in the beaker. Adjust the tube *C* so that it is sealed about ½-inch in the acid solution. Measure, by means of pipette, 50 c.c. of the liquor to be tested into the boiling flask *A*, add water until the solution is about 300 c.c., adjust the flask so that its bottom is about 2 inches above the top of the Bunsen burner, drop into the flask about 10 grammes of caustic soda or potash, either in solution or dry, and quickly connect the apparatus together by means of the rubber stopper at the bottom of *B*. This can easily be done by reason of the flexible rubber stopper at the bottom of *B*. This can easily be done by reason of the flexible rubber connections between *B* and *C*.

Begin to boil the solution in *A*, slowly at first, and gradually increasing until it is at a brisk boil. Continue boiling until the solution in *A* has been reduced in volume about one-half. Remove the flame and disconnect the apparatus, taking it apart also at the rubber connection at the top of *C*. Raise *C* clear of the solution in *P*, and wash *C* into *D* with water, inside and out. It may be washed on the inside by attaching a small funnel to the rubber tube at the top. Set *D* aside to cool. It could be titrated hot, but the color reaction is not so clear as when it is at an ordinary temperature.

When the solution is at about the temperature of the room, color with the cochineal and neutralize with the normal soda solution as directed in the first test for acid.

Suppose that in this case it requires 6.8 c.c. of the semi-normal or 3.4 c.c of the normal carbonate of soda to neutralize the solution. We then have the following data:

A, normal acid used.....	56.00 c.c.
S, normal soda used.....	3.40 c.c.
L, liquor tested.....	50.00 c.c.
Strength of acid.....	6.54 ounces per gallon.

The following equation will give us the strength of the liquor:

$$L : (A - S) :: 6.54 : X.$$
$$L = 50.$$
$$A - S = 52\,6.$$

Therefore—

$$50 : 52.6 :: 6.54 : X.$$
$$X = 6.88.$$

The strength of the liquor is, therefore, 6.88 ounces per gallon. In other words, the acid neutralized, as found by deducting the amount of normal soda used from the original amount of acid taken, multiplied by 6.54 and divided by the amount of liquor taken for the test, will give the strength of the liquor in ounces per gallon.

If it is required to designate the amount of ammonia in pounds per gallon, multiply the ounce strength by .0217. Thus, in the case of the liquor we have been considering, which is 6.88 ounces per gallon, there would be .1493 pound of ammonia to the gallon. In the same manner, if the per cent. of ammonia by weight is required, we first find the weight of a gallon of the liquor at 60° F. and divide the weight of the ammonia to the gallon by it. To compute the yield of sulphate per gallon, multiply the pounds of ammonia per gallon by 3.88, which will give the sulphate in pounds.

A rough test for concentrated liquor, which will be within 1 or 2 per cent. of correct, is as follows:

Take of 66° Baume, of 1.84 specific gravity sulphuric acid, 11 fluid ounces. Add to this 29 fluid ounces of water. Then, taking 2 fluid ounces of concentrated liquor, each ½ fluid ounce of acid will indicate 1 ounce strength of the liquor. The test is made by dropping the acid from a burette, graduated to fractions of a fluid ounce, into the liquor, stirring continuously with a glass rod and testing frequently by applying the wetted end of the rod to blue litmus paper until it changes slightly to red.

It is as important for the superintendent of a gas works to know the number of ounces or pounds of ammonia that he produces as it is to know the bushels of coke or gallons of tar. Unless the production of ammonia runs as evenly as the other residuals something is wrong and should be remedied. It is of great importance to the one who concentrates his liquor, for, by sampling and testing systematically both his crude and his concentrated liquors, he is informed of the efficiency of his apparatus. The one who sells his liquor by the ton of coal carbonized should know the amount he is producing, for it will give him a basis of comparison with the conditions at other places and valuable data on which to base any renewal or change of contract. Those who sell by the pound of ammonia or by the ounce-gallon should certainly test their own liquor, for a check, for he would be thought a peculiar manager who sold coke by the ton and had no scales nor weighmaster.

[To be Concluded.]

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

THE Western Gas Construction Company has closed a contract with the Kentucky Heating Company, of Louisville, Ky., for a special auxiliary water gas apparatus, of the Lowe type, the apparatus to have a capacity of 1½ million cubic feet per day. The new installation is to supplement the supply of natural gas during the winter season.

A RECENT issue of *Puck* is responsible for the following: Paterfamilias—"But have you any idea of the expenses of married life? Have you made any provision for the future?" Daughter's Lover—"Y-yes, sir; I-aw-voted for dollar gas, you know."

THE plant and franchises of the Battle Creek (Mich.) Gas Light Company have been purchased by a syndicate headed by Mr. David Henning, of Chicago. The new executive management is: Directors, David Henning, M. A. Foote, Henning Frazer, Edwin Henning and S. S. Hulbert; President, David Henning; Vice-President, W. A. Foote; Treasurer, Henning Frazer; Secretary, S. S. Hulbert. The proprietors propose to construct a gasholder up to retaining 100,000 cublic feet, and to put down at least 6 miles of mains this season. Mr. James Watts will be retained as Superintendent.

THE Bristol (Tenn.) Gas, Electric Light and Power Company and the Consumers Electric Company, of Bristol, have been consolidated. The name of the consolidated concern is that of the Bristol Gas and Electric Company.

THE following is the text of a measure introduced some days ago in the Louisiana Legislature by Mr. Denechaud:

"Making it a misdemeanor for telephone, gas, water and electric light and power companies operating public franchises to refuse to supply consumers with monthly service, and providing penalties for the violation of this act.

"Section 1. Be it enacted by the General Assembly of the State of Louisiana that it shall be unlawful for any telephone, gas, water, electric light and power companies, operating public franchises in any city or village in this State, to refuse to supply to consumers by the month such service as they may require.

"Sec. 2. Be it further enacted, That any company violating the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction shall pay a fine of not less than $100, nor more than $1,000, for each violation, the same to be recoverable before any court of competent jurisdiction.

"Sec. 3. Be it further enacted, That this act shall take effect from and after October 1, 1898."

MR. CLIFFORD L. SLADE, formerly in charge of the works of the Westchester Gas and Electric Company, of Port Chester, N. Y., died suddenly, in Yonkers, N. Y., something over a fortnight ago. Deceased was in his 26th year.

ADVICES by way of Kansas City, Mo., are to the effect that the gas and electric light plants of the Pittsburg (Kas.) Gas Light and Coke Company have been sold, under foreclosure of a mortgage, to the National Bank of Pittsburg, at its bid of $40,000. The sale was made subject to a mortgage of $52,500 and to the further approval of the District Court. In the event of such approval the Bank proposes to operate the plants.

THE Huntington (L. I.) Railroad Company, operating between Huntington Harbor, the village of Huntington and Huntington depot—a distance of about three miles—has just passed into the control of the Long Island Railroad. The line is being equipped for operation under the electric trolley system. Two 55-horse power 3-cylinder Westinghouse gas engines are in place, and the line will commence operations about June 25th. The gas is to be furnished by the Huntington Gas Company.

THE Board of Gas and Electric Light Commissioners has granted the petition of the Amherst (Mass.) Gas Company for the approval of an issue of $15,000 new stock, the proceeds to go towards taking up the debt incurred for certain plant expenditures. The minimum price that may be accepted for the stock is put at par.

A CORRESPONDENT, writing under date of June 3d, incloses the following: "The Decatur (Ills.) Gas and Electric Company is now ready for business in its new office, at 124 South Main street, on the ground floor of the Orlando Powers office building. From the changes already made, and the others under consideration, it is evident that the new Company is going to give the people of Decatur the best service that it is possible. The new management proposes to make many improvements, and it further understands that the goodwill of all (so far as that may be obtained) the residents of Decatur will be a great help to the conduct of a profitable business. With this thought in clear view, many improvements, on the gas and electric divisions of the plant, are to be made, and rates for both sorts of service are to be put at the lowest possible. The rate for a fuel gas supply is $1 per 1,000, and the Company will furnish ranges at cost, and make no charge for connecting them up. The revised schedule for an electric light and power supply is appended: "*Incandescent Lamps.*—On circuit, running from ordinary lighting time to 9 P.M., the rate shall be 65 cents per month, on each 16-candle power lamp, and 5 cents per hour per month for each additional hour; all night light, $1.20 per month; all day light, 75 cents per month; morning light, 25 cents each per month, from Oct. 1st to May 1st. *Arc Light Rate.*—To 6 P.M., $5 per month; to 9 P.M., $7 per month; to 11 P.M., $8 per month. Discount will be given on two or more lights. On all arc lights service will begin at ordinary lighting time; but no daylight service will be rendered without additional charge. *Power Rate.*—The rate for electric power shall be 10 cents per 1,000 watts, with discount to large consumers. All bills will be due the 1st of each month, and if not paid by the 10th the Company reserves the right to discontinue the service. The Company will not employ collectors."

THE above mention of what is going on in Decatur may be supplemented by the information that the Western Gas Construction Company has closed a contract with the Decatur Gas and Electric Company for a complete setting of the Construction Company's improved Lowe water gas apparatus, with a capacity of 300,000 cubic feet per day. Last year the Construction Company changed over, at Decatur, a plant of the Kendall type, so that the latter now is to every intent an apparatus of the Construction Company's sort.

A PETITION was filed early this month, by the attorneys of the Westfield (Mass.) Gas Light Company, to the Supreme Court, respecting the vote of the town to take over for operation on municipal account the gas and electric lighting plants of the Company. The petition recited that, as the Company and the town had failed to agree upon a price for

(*Continued on page* 942.)

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,

PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,

EDITORS.

CHAS. E. SANDERSON,

MANAGER.

MONDAY, JUNE 13, 1898.

(*Continued from page* 941.)

the properties, it was necessary that the Court appoint special commissioners to determine what the price should be. The Company valued its properties at $250,000. The estimate of the Selectmen was just $100,000.

At a recent meeting of the Directors of the Attleboro (Mass.) Gas Company the gross selling rate was put at $1.70 per 1,000 cubic feet. Prompt payment (within 15 days from the time of rendering the bills) entitles the user to a rebate of 20 cents per 1,000. It may be remembered that not long ago Attleboro suffered from a disastrous fire, and many of the Gas Company's consumers were included in the list of those "burned out." The Directors of the Company, at the meeting at which the reduction was ordered, also agreed not to submit any bills to their consumers in the burned over district for gas used between the time of the last reading of the meters and the date of the fire.

The electric light plant of the Macon (Ga.) Gas Light and Water Company has been finally sold to the Macon and Indian Spring Railroad Company, at its bid of $40,000. The correspondent who informed us of this sale inclosed the following in further connection therewith: "Some time ago it was agreed between Receiver T. D. Tinsley, of the Gas Light and Water Company, and the Railroad Company that it would be to the best interests of all parties concerned if the plant should go into the hands of the Macon and Indian Spring Street Railroad Company for $40,000, and the Court had almost concluded to order the sale made, but Judge Speer eventually decided that it might be well to give other people a chance to bid if they desired to do so, and he therefore directed the Receiver to advertise the property at public sale, with an upset price of $40,000 It was known some time ago that the upset price was not likely to be exceeded, and Receiver Tinsley found his work as auctioneer not very tiresome. It was finished in a few seconds, the sale taking place at the entrance to the government building. Mr. J. H. Hertz represented the Railroad Company. The City Council has approved the purchase of the plant, and the purchasers will be required to give bond to fulfil the Water Company's contract with the city."

At the annual meeting of the Citizens Gas Company, of Willimantic, Conn., the following Directors were elected: E. S. Boss, George E. Stiles, Edwin Evans, Solomon Lucas and Luther Hill—Mr. Hill fills the vacant place occasioned by the death of Mr. O. H. K. Risley.

The Standard Gas Company, of North Tonawanda, N. Y., has been incorporated. It is capitalized in $25,000.

City Solicitor McVeity, of Ottawa, Can., having been asked by the Council for an opinion respecting the right of the Ottawa Gas Company to open the streets without a special permit for each opening, has returned the following reply: "The Company has the right to dig and open up the streets of Ottawa so far, and so far only, as it may be necessary to do so for the purpose of laying and repairing its pipes. In doing this, however, it is bound not to unnecessarily obstruct the streets, or to do unnecessary damage, and is bound forthwith to restore the streets to the same condition in which it found them. Should the Company, after reasonable notice, refuse or neglect to put the streets in as good condition as they were before it began work, the corporation may do the work necessary to restore them to that condition, charge the Company therefor, and recover the amount by action."

"Observer" forwards the following clipping, from the New Haven *Leader*, of the 2d inst.: "The New Haven Gas Light Company has announced to its consumers that it will make rebates to those who use gas for cooking, heating or power, when measured by a separate meter, of 25 cents per 1,000 cubic feet, making the net price $1 per 1,000 feet. There are further rebates on annual quantities used as follows: Annual bills amounting to $500, 5 cents off per 1,000; bills of $1,500, 10 cents per 1,000; bills of $2,000, 15 cents per 1,000; bills of $5,000, 20 cents per 1,000."

The proprietors of the Brantford (Ont.) Gas Company have determined to operate the plant on their own account hereafter, the period of the lease to Messrs. A. Finkle & Co. having expired. Mr. R. Frankland has been appointed Superintendent. No change will be made in the selling rates.

Ald. Martin, who misrepresents the Sixth Ward in the Chicago Board of Aldermen, it is said proposes to introduce an ordinance to the attention of his colleagues, under which the Gas Companies of Chicago are to be required to pay a tax of $2 per annum on each and every meter in use by them. Mayor Harrison, however, has emphatically expressed himself in opposition to any such measure.

Mr. W. F. Douthirt, speaking for the new management of the Binghamton (N. Y.) Gas and Electric Company, said: "Some changes will be made in the policy of the business, including a reduction in the price of gas. On July 1st next bills will be rendered to consumers at the rate of $1.60 per 1,000 cubic feet for gas consumed during the months of May and June. Heretofore the following discounts have been allowed for prompt payment: 10 cents per 1,000 cubic feet on bills under $50; 20 cents on bills over $50; and 30 cents on bills over $100. On such bills rendered July 1st, that are paid at the office of the Company on or before July 10th, the new Company will allow discounts of 20 cents per 1,000 on all bills under $50; 30 cents on bills over $50; and 40 cents on all bills over $100. Commencing August 1st, bills will be rendered monthly instead of bi-monthly as heretofore, and discounts will thereafter be allowed on bills paid at the Company's office on or before the 10th day of the month following the month in which the gas was used, of 20 cents per 1,000 on all bills under $25; 30 cents per 1,000 on all bills over $25; and 40 cents per 1,000 on all bills over $50. This change in the discount rate amounts practically to a reduction of 10 cents per 1,000 in the price of gas all round; but the discounts will in no case be allowed unless the bills are paid at the Company's office on or before the 10th of each month. There will also be a change in the matter of laying service pipes. Heretofore the consumer has been obliged at his own expense to employ a plumber to tap the street main and lay the service pipe into his premises. The new Company is now organizing a force to do this work, and as soon as the force is organized and equipped the Company will lay services free of charge to the consumer's lot line, and will lay the pipe from the lot line to the meter at a fixed price per foot, which will be the actual cost. Meter connections will be furnished free. The Company has also under consideration large extensions of the street main system during the present summer, including an extension to Lestershire. Ample funds have been provided to do the work."

Lamp Inspector Hopkins, of New Haven, Conn., reports that there are in use on the streets in that city the following number and kind of public lamps: Arc electric, 446; police signal, 27; Welsbach gas lamps, 105; ordinary gas lamps, 611; naphtha lamps, 505.

The numbers of public lamps in use on the streets, alleys, etc., of St. Louis, according to the annual report of the Supervisor of City Lighting (Mr. A. J. O'Reilly), are: Arc electric, 2,477; incandescent electric, 4,022; gas, 1,142; gasoline, 169.

A second gas engine of 125-horse power was recently installed in the electric annex of the Stockton (Cal.) Gas and Electric Company.

The Market for Gas Securities.

The wiseacres have again turned their attention to the gas situation in New York city, and rumors have been flying thick and fast that complete consolidation of all the gas interests of the city is near at hand. Under the conditions, Consolidated advanced sharply to 205½, which means a gain of 15 points for the week. The opening to-day (Friday) was made at 205 to 205½. We expect to see higher prices made in Consolidated this summer than have hitherto been recorded in it. Oddly enough, Standard common showed some weakness, whereas, according to our lights, a stout advance should have been in evidence. Other city shares show no particular change.

Brooklyn Union moved up sharply to 123¾, and the probability is that it will go to at least 130. Bay State went to 4, at which figure considerable stock changed hands. Baltimore Consolidated is 61½ to 61⅝, and Peoples Gas, of Chicago, is very strong at 103. Lacledes are steady. There is good inquiry for gas bonds, at advancing figures. We note a recent sale of Menominee (Mich.) Gas Light and Fuel Company's first mortgage 6's, at 110. Laclede firsts are 104½ to 105, and Brooklyn Union 5's are frequently inquired for at 114¾ to 115. Detroit gas holds fairly well to former quotations, and Buffalo city gas is a trifle weaker.

Gas Stocks.

Quotations by Frederic B. Cochran & Co., Brokers and Dealers in Gas Stocks.

20 and 22 Broad Street, New York City.

June 13.

☞ All communications will receive particular attention ☜ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$36,230,000	100	205	205½
Central	500,000	50	..	..
" Scrip	220,000	..	100	.
Cental Union, Bonds, 5's	3,000,000	1,000	99¼	100
Equitable	4,000,000	100	206	215
Bonds, 6's	1,000,000	1,000	106	..
" 1st Con. 5's	2,300,000	1,000	114	.
Metropolitan Bonds	658,000	..	108	112
Mutual	,500,000	100	330	335
" Bonds	1,500,000	1,000	100	102
Municipal Bonds	750,000	.	..	.
New Amsterdam Gas Co.	13,000,000	100	30	30¾
Preferred	10,000,000	100	72	73
Bonds, 5's	11,000,000	1,000	100¾	101¼
Northern	150,000	50		
" Bonds	150,000	1,000	..	
Northern Union, Bonds, 5's	1,250,000	1,000	94¼	95¼
New York and East River	5,000,000	100	81	83
Preferred	2,000,000	100	112	115
Bonds 1st 5's	3,500,000	1,000	110	112
" 1st Con. 5's	1,500,000	..	105	107
Richmond Co., S. I.	348,650	50	70	..
" Bonds	100,000	1,000	..	..
Standard	5,000,000	100	139	142
Preferred	5,000,000	100	157	162
Bonds, 1st Mortgage, 5's	1,500,000	1,000	112	114
Yonkers	299,65	500	130	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	123¾	24
" " Bonds (5's)	15 000,000	1,000	114¾	115
Bay State	50,000,000	50	3¼	3½
" " Income Bonds	2,000,000	1,000	..	75

Boston United Gas Co.—				
1s Series S. F. Trust....	7,000,000	1,000	..	92
2d " " "	3,000,000	1,000	70	..
Buffalo City Gas Co.	7,000,000	100	25	26
" " Bonds, 5's	7,000,000	1,000	93¾	94½
Central, San Francisco.....	2,000,000	..	95	..
Chicago Gas Co. Guaranteed Gold Bonds.....	7,650,000	1,000	104	104¼
Columbus.....	1,069,000	.	89	91
1st Mortgage.....	1,085,000	..	101	108½
Consumers. Jersey City....	2,000,000	100	75	80
" Bonds.....	600,000	1,000	100	108¾
Cincinnati G. & C. Co.....	8,500,000	100	204½	205
Consumers, Toronto.....	1,800,000	50	184½	187
Capital, Sacramento.....	500,000	50	..	35
Bonds (6's).....	150,000	1,000	..	..
Consolidated, Baltimore...	11,000,000	100	61¼	61⅝
Mortgage, 6's.....	3,800,000	..	107	107½
Chesapeake, 1st 6's.	1,000,000	..	..	..
Equitable, 1st 6's.	910,000	..	..	..
Consolidated, 1st 5's....	1,490 000	..	..	..
Consolidated G. & E. Co.'s, Little Falls, N.Y.....	90,000	100	..	100
Bonds.....	75,000	..	..	100
Detroit	4,000,000		58	58¼
" Con. Bonds.....	4,312,000	..	94½	98
Equitable Gas & Fuel Co., Chicago, Bonds.....	2,000,000	1,000	..	101
Fort Wayne	2,000,000	..	75	80
" Bonds.....	2,000,000	..	88	91
Hartford.....	750,000	25	..	145
Indianapolis.....	2,000,000	..	115	125
" Bonds, 6's.....	2 650,000	..	106	107
Jersey City.....	750,000	20	180	..
Lafayette Gas Co., Ind.....	1,000,000	100	78	83
Bonds.....	1,000,000	1,000	90	91
Louisville.....	2,570,000	50	..	..
Laclede, St. Louis	7,500,000	100	50⅝	51¾
Preferred.....	2,500,000	100	93¾	98
Bonds.....	9,034,400	1,000	104½	105
Montreal, Canada	2,000,000	100	200	..
Newark, N. J., Gas Co.....	1,000,000	..	200	220
Bonds, 6's	4,000,000	..	128	130x
New Haven.....	1,000,000	25	252	..
Oakland, Cal.....	2,000,000	..	53½	54
" Bonds.....	750,000	..	..	..
Peoples G. L. & Coke Co., of Chicago.....	25,000,000	100	102¾	103
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage....	20,100,00	1,000	..	108
2d "	2,500,000	1,000	104	105
Peoples, Jersey City.....	500,000	50	..	175
Rochester Gas & Elec. Co..	2,150,000	50	..	..
Preferred.....	2,150,000	50	83	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	10,000,000	100	94	94½
St. Paul Gas Light Co.....	1,500,000	100	49	51
1st Mortgage 6's.....	650,000	..	84	87
Extension, 6's.....	600,000	..	..	..
General Mortgage, 5's..	2,400,000	.	88	90
Syracuse, N. Y.	2,500,000	25	17	18
Bonds.....	1,000 000	..	94	97
Washington, D. C	2,000,000	20	250	..
Western, Milwaukee	4,000,000	100	77	78¼
Bonds, 5's.....	3,556,000	.	100½	102
Wilmington, Del.....	550,000	50	200	

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DIVIDEND NOTICE.

OFFICE OF WELSBACH LIGHT CO.,
DREXEL BUILDING, PHILA., June 8, 1898.

The Directors have this day declared a dividend of One Dollar per share, payable June 25, 1898, to stockholders of record at the close of business June 17th. Checks will be mailed.

1201-2 EDWARD C. LEE, Treas.

WANTED,

Gas Engineer and Draughtsman.

Apply by letter, stating experience and salary desired, to

JAMES R. FLOYD'S SONS,
539 West 20th street, New York.

1201-1

Situation Wanted,

By Engineer and Gasmaker.

Ten years' experience. Has had charge of large plant, and can furnish best of references. Address

1201-1 "N. Y.," care this Journal.

DR. MOSS is open to engage with responsible firm as representative, or charge of works. Will advise on all difficulties met with in the manufacture and distribution of Coal, Oil or Water Gas. Terms reasonable.

Address
DR. MOSS,
1178-tf Care this Journal.

SUPERINTENDENT.

An active man wants the management of a gas property. A close manager, especially expert in the handling of Lowe water gas machinery. Member of the American Gas Light Association.

1184-tf "F. J.," care this Journal.

FOR SALE.

Ten Sections of Second-Hand 20-Inch Hydraulic Main for Benches of Fives.

Address E. H. YORKE, Engineer,
1201-2 Portland Gas Light Co., Portland, Me.

FOR SALE,

One Small Rotary Exhauster, in good repair; exhauster and engine on same bedplate.

Two 5x5 Purifying Boxes, good as new. Also,

Two Steam Pumps, with 1¼-inch suction and 2-inch discharge. Must be sold. Address

CARTHAGE LIGHT COMPANY,
1200-4 Carthage, Mo.

For Sale.

A Small Gas and Electric Light Plant,

in a Southern city of 3,800 inhabitants.

Address FORT WAYNE ELECTRIC CORPORATION,
1097-tf Fort Wayne, Ind.

FOR SALE.

Hydraulic, Dip, Branch and Ascension Pipes, Mouthpieces and Lids, for four Benches of 5's and for one Bench of 3 retorts.

Two Coolers, or Air Condensers, each of 150'000 cubic feet capacity.

Multitubular Condenser, shell, 36 in. diameter, with 98 2-in. tubes, 10 ft. 6 in. long.

D-Shaped Tar Extractor, 8 ft. long, 1 ft. 6 in. deep.

Scrubber, 48 in. diameter, 11 ft. 9 in. high. Three man holes, 11 in. by 15 in.

S-inch Center Seal. Four Purifiers, 8 ft. x 6 ft.

KEY CITY GAS CO
1119-tf Dubuque, Iowa.

FOR SALE,

at a bargain,

Two 50-H P. Otto Gas Engines,

in first-class condition.

Address WOONSOCKET GAS CO.,
1175-tf Woonsocket, R. I.

Iron Roof For Sale.

Width of building, 155 feet out to out, divided into a center span 66 feet, with a wing on each side 43 feet 6 inches; total length of the building, 350 feet. This building is designed with brick side and gable walls, with iron roof trusses and iron supporting columns. Originally built for an Iron Foundry, but, owing to the failure of the purchaser, is now offered for sale at a bargain. Is admirably adapted for a Foundry for light or heavy castings, Machine Shop, Car Barn, or for any other general manufacturing purposes. We guarantee the ironwork as good as new, the building never having been used.

Berlin Iron Bridge Company,
EAST BERLIN, CONN.

Utilize Your Gas Liquor.

NO EXTRA LABOR OR OPERATING EXPENSES.

Ammonia Concentrator,

Not Expensive. Write to

STROH & OSIUS, Pat'ees, or
Mich. Ammonia Works, Detroit, Mich.

Steward's Specials

ARE

DURABLE, UNIFORM,

AND OF

AMERICAN

MANUFACTURE.

Samples will be cheerfully sent to Gas Companies.

WE MAKE LAVA TIPS OF ALL KINDS.

THE D. M. STEWARD MFG. CO.,
CHATTANOOGA, TENN.

Our Mica Chimneys

2 PIECE MICA CHIMNEY.

Etched Chimneys to Order.

For Welsbach Lights

ARE THE

BEST IN THE WORLD.

Get Catalog and Discounts.

The MICA MFG. CO

Micasmiths,

88 Fulton Street, N. Y. City.

KENTUCKY CANNEL COAL,

FOR GAS AND DOMESTIC USE.

GEO. R. HISLOP, F.C.S., F.R.S.S.A., Gas Engineer of Paisley, Scotland, says in his analysis: "This is a remarkably rich Cannel Coal, yielding illuminating matter per ton equivalent to 1,945 lbs. of sperm candles."

This coal mined and shipped in box cars. Write for sample car and delivered price.

The Greasy Creek Cannel Coal and Tramway Co.,
58 and 60 WALDO PLACE, CHICAGO, ILL.

THE ANDERSON Patent Cutter Carrying Link

Made in all sizes.

Will cut from 2 in. to 24 in.

Pipe Cutting Tool

For Cutting Cast, Wrought Iron, Gas & Water Pipes.

THE ANDERSON PIPE CUTTER COMPANY, Manufacturers,
163 Liverpool st., E. Boston, Mass
N. Y. Office, 135 Greenwich St
C. H. TUCKER, JR., Manager.

WALDO BROS.,
102 Milk Street, Boston, Mass

INCANDESCENT GAS LIGHT.

American Patent No. 575,262, of December 1, 1897.

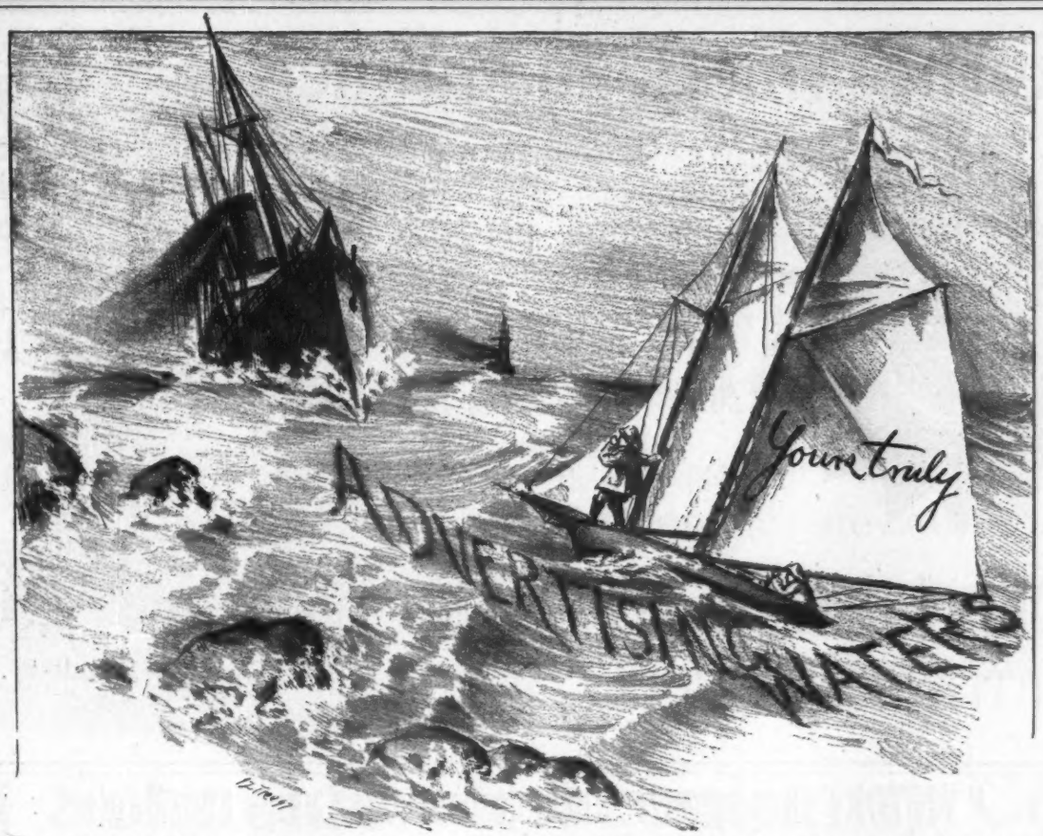
NO INFRINGEMENT OF THE "WELSBACH" PATENT.

Highest Lighting Power, in Combination with Greatest Durability.

Mantles Impregnated, - - - 100 pieces, 22 Marks.
Transportable Mantles, ready for use, 100 pieces, 32 Marks.

Prices, c.i.f. Hamburg or Bremen.

HUGO CAHEN Manufacturer of Incandescent Gas Fittings,
No. 61 Elsasserstrasse, BERLIN, N., GERMANY.



Ship Ahoy! Yours Truly, an Advertising Pilot, is Ready to Come Aboard.

Think of the number of ships that annually pass in and out of New York harbor. How few run aground in transit!

It's because they all have a pilot aboard.

There would be just as few advertising ships grounded in proportion to those that sail, if they employed pilots.

An advertising pilot is not a bright young man picked out of the staff of clerks and given the helm.

It isn't the manager of the business himself, for he has too much else to do. A man can't steer a ship with his teeth while he's splicing rope with his hands.

A pilot is not a regular member of the ship's company, but is employed for the express purpose of steering in certain waters.

A business bark which expects to sail safely through advertising waters needs a pilot.

Ship ahoy! Yours Truly, an advertising pilot, is ready to come aboard.

Some Gas Companies are in advertising waters now. Some are expecting to shape their course in this direction. All would find that they could sell far more Gas by giving the people attractive information about its economy and convenience for lighting, cooking and heating.

Yours Truly has studied the Gas business with relation to advertising. He is now working for Gas Companies, and has some special plans to suggest to any who may be interested.

Yours Truly is a Business writer with a record, being the winner of the largest prize--$1,000--ever offered for advertising writing.

It is time now to get ready for an early Fall campaign.

Just one remark concerning terms; the most expensive luxury a Gas Company can indulge in is cheap help in advertising.

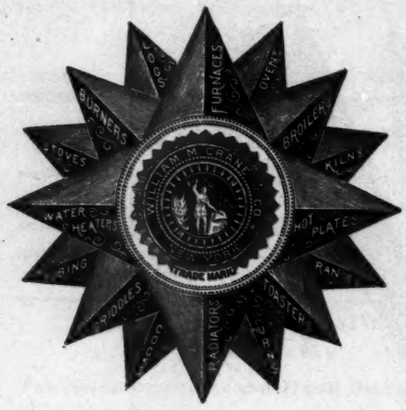
I have no ready-made work; each new customer requires special study.

Yours truly
J. A. RICHARDS,
ADVERTISING.

5 Beekman Street,
Temple Court, N. Y.

P. O. Box, 2283.
Phone, 721 Cortlandt.

Like the American Gunner,



We have a Perfect Range, and many appliances for using Gas. We have assisted Uncle Sam with Kilns for Firing Army and Navy Buttons, Melting Pots for Molding Bullets. . . .

Don't forget that we are constantly experimenting, and may help you in your output. We make Gas Appliances exclusively. . . .

Our Unique Water Heater and Vulcan Thermostat will furnish Hot Water, and no cause to kick from excessive Gas Bills, because there is no waste of fuel.

WILLIAM M. CRANE & CO.,

FACTORY: 447 to 453 West Fourteenth St. OFFICE: 838 Broadway.

NEW YORK.

"VICTOR" Regenerative Incandescent Gas Lamps and Mantles

No Air Shutter, therefore no Smoked Mantles. Hot Air taken from Chimney. Impossible to snap back. "VICTOR" MANTLES are the strongest and most durable on the Market.

Address for full particulars and Illustrated Catalogue,

VICTOR INCANDESCENT CO., 171-173 6th Ave., N.Y. City.

Gas Investments in California.

Nowhere else on this continent does such opportunity exist for profitable gas investment as on the Pacific Coast, since the perfection of the new LOWE Process for using the heavy crude California oils (of which there is an unlimited supply) without the use of any other fuels. Seven years' test proves the system to be perfect in every respect. Los Angeles alone, in addition to present street mains, has 150 miles of well built up streets without a gas main on them. To occupy this territory, and a large number of other towns now without gas, we have organized a parent company and a number of local companies covering some of the fastest growing cities in the United States.

Now is the time to invest, when the first capital will be able to double itself in a single year. This is also the most delightful residence section in the United States.

We suggest to those desiring gas investments, in large or moderate amounts—with or without active business connections—to come here and investigate; or, what is the next best thing, write us for particulars and prospectus.

The accompanying cut shows the oil wells in the suburbs of Los Angeles from which the Companies under the NEW LOWE GAS PROCESS obtain their supply of oil.

AMERICAN GAS & COKE CO. (T. S. C. Lowe, Manager),

406 Bradbury Building, Los Angeles, California.

THE GAS ENGINEER'S POCKET-BOOK.

By HENRY O'CONNOR.

Comprising Tables, Notes and Memoranda relating to the Manufacture, Distribution and Use of Coal Gas, and the Construction of Gas Works.

Price, - - $3.50.

A. M. CALLENDER & COMPANY, No. 32 Pine Street, N. Y. City.

WE respectfully solicit correspondence from every Gas Company interested in the sale of Gas Ranges, Hot Plates, etc., for the season of 1898. . . .

Our lines are complete, and we guarantee prompt service.

LET US FIGURE WITH YOU.

THE Schneider & Trenkamp Co.,

CLEVELAND, O. CHICAGO, ILL.

BRISTOL'S RECORDING

PRESSURE GAUGE.

For continuous records of **Street Gas Pressure**

Simple in Construction, Accurate in Operation Low in Price.

Fully Guaranteed. Send for Circulars.

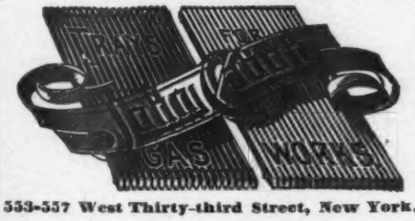
The Bristol Co.,

Waterbury, Conn.

Special Trays for Iron Sponge or Oxide of Iron,

CHURCH'S TRAYS a Specialty.

Reversible, Strongest, Most Durable, Most Easily Repaired.



553-557 West Thirty-third Street, New York.

We also make the Cheapest and Strongest REVERSIBLE BOLTED TRAYS IN THE MARKET.

Send for Circulars.

F. BEHREND,

SOLE IMPORTER OF THE CELEBRATED

German (Stettin-Didier) Clay Gas Retorts,

BLOCKS, TILES, FIREBRICKS, FIRE CEMENT

Stettin "Anchor" & "Eagle" Brand Portland Cement

10 & 12 Old Slip, New York.

IRON MASS

For Gas Purification.

Acts immediately, and more efficiently than any other purifying agent now in use.

GREENPOINT CHEMICAL WORKS,

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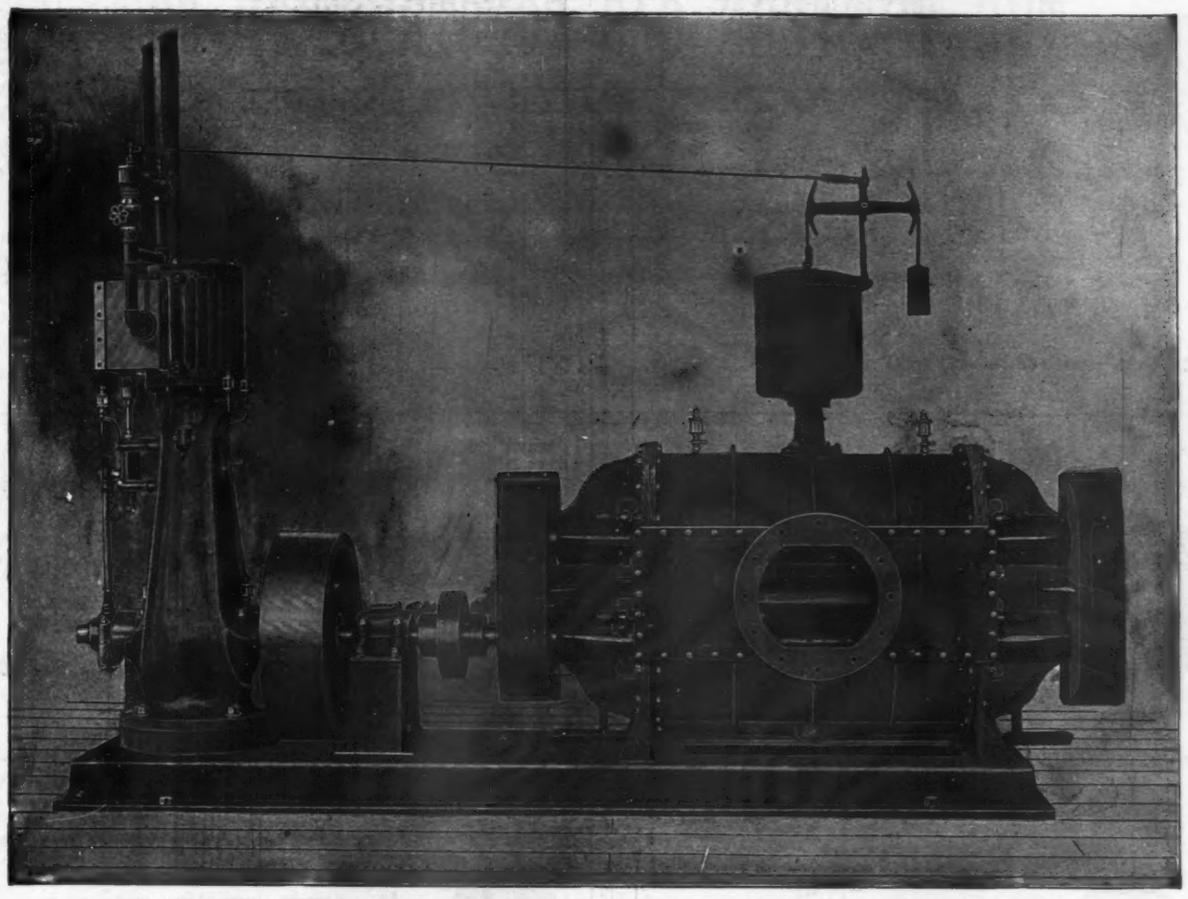

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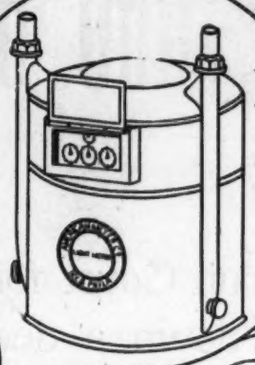

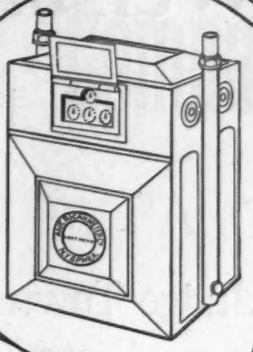

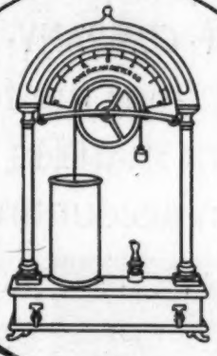

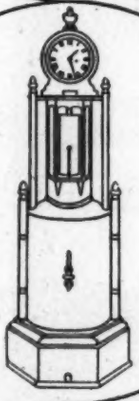

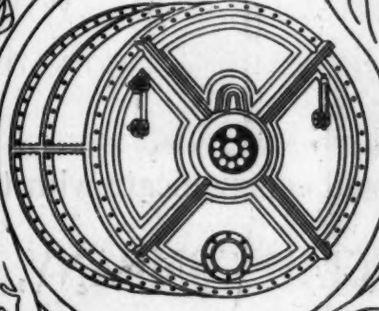

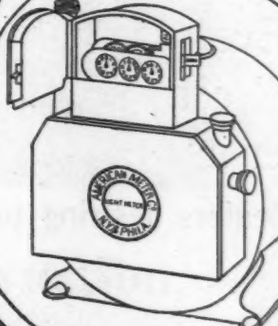

PUBLIC LIGHTING TABLE.

JUNE, 1898.

Day of Week.	Date.	Table No. 1. FOLLOWING THE MOON. Light.	Extinguish.	Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING. Light.	Extinguish.
				P.M.	A.M.
Wed.	1	1.30 AM	3.30 AM	7.15	3.15
Thu.	2	2.20	3.30	7.15	3.15
Fri.	3	No L.	No L.	7.15	3.15
Sat.	4	No L. PM	No L.	7.25	3.15
Sun.	5	No L.	No L.	7.25	3.15
Mon.	6	8.00 PM	10.50 PM	7.25	3.15
Tue.	7	8.00	11.30	7.25	3.15
Wed.	8	8.00	12.00	7.25	3.15
Thu.	9	8.00	12.30 AM	7.25	3.15
Fri.	10	8.00 LQ	1.00	7.25	3.15
Sat.	11	8.00	1.20	7.25	3.15
Sun.	12	8.00	1.50	7.25	3.15
Mon.	13	8.00	2.10	7.25	3.15
Tue.	14	8.00	2.40	7.25	3.15
Wed.	15	8.00	3.30	7.25	3.15
Thu.	16	8.00	3.30	7.25	3.15
Fri.	17	8.00	3.30	7.25	3.15
Sat.	18	8.00 NM	3.30	7.30	3.15
Sun.	19	8.00	3.30	7.30	3.15
Mon.	20	8.00	3.30	7.30	3.15
Tue.	21	8.00	3.30	7.30	3.15
Wed.	22	8.00	3.30	7.30	3.15
Thu.	23	9.10	3.30	7.30	3.15
Fri.	24	9.40	3.30	7.30	3.15
Sat.	25	10.00	3.30	7.30	3.15
Sun.	26	10.30 FQ	3.30	7.30	3.15
Mon.	27	10.50	3.30	7.30	3.15
Tue.	28	11.30	3.30	7.30	3.15
Wed.	29	12.00	3.30	7.30	3.15
Thu.	30	12.50 AM	3.30	7.30	3.15

TOTAL HOURS LIGHTING DURING 1898.

By Table No. 1.	Hrs. Min.	By Table No. 2.	Hrs. Min.
January	210.40	January	423.20
February	186.40	February	355.25
March	181.20	March	355.35
April	166.10	April	298.50
May	156.40	May	264.50
June	144.30	June	234.25
July	147.30	July	243.45
August	157.10	August	280.25
September	169.50	September	321.15
October	186.00	October	374.30
November	204.30	November	401.40
December	218.30	December	433.45
Total, yr.	2129.30	Total, yr.	3987.45

Welsbach Patent Sustained.

INJUNCTION GRANTED.

Judge Townsend, in the United States Circuit Court for the Southern District of New York, has handed down a decision sustaining the Welsbach Light Company's Rawson patent, and adjudged **THE SUNLIGHT INCANDESCENT GAS LIGHT COMPANY** to be an infringer. This Company has been enjoined from the further use of its method of manufacture of incandescent mantles or the sale or use of the same, and ordered to render an accounting.

A further decision has been handed down by Judge Lacombe in the United States Circuit Court, granting a motion for a similar injunction against **THE REX INCANDESCENT LIGHT COMPANY.**

Every other manufacturer of incandescent mantles in the United States is under these decisions an infringer of this patent, and the Welsbach Light Company will proceed against them at once.

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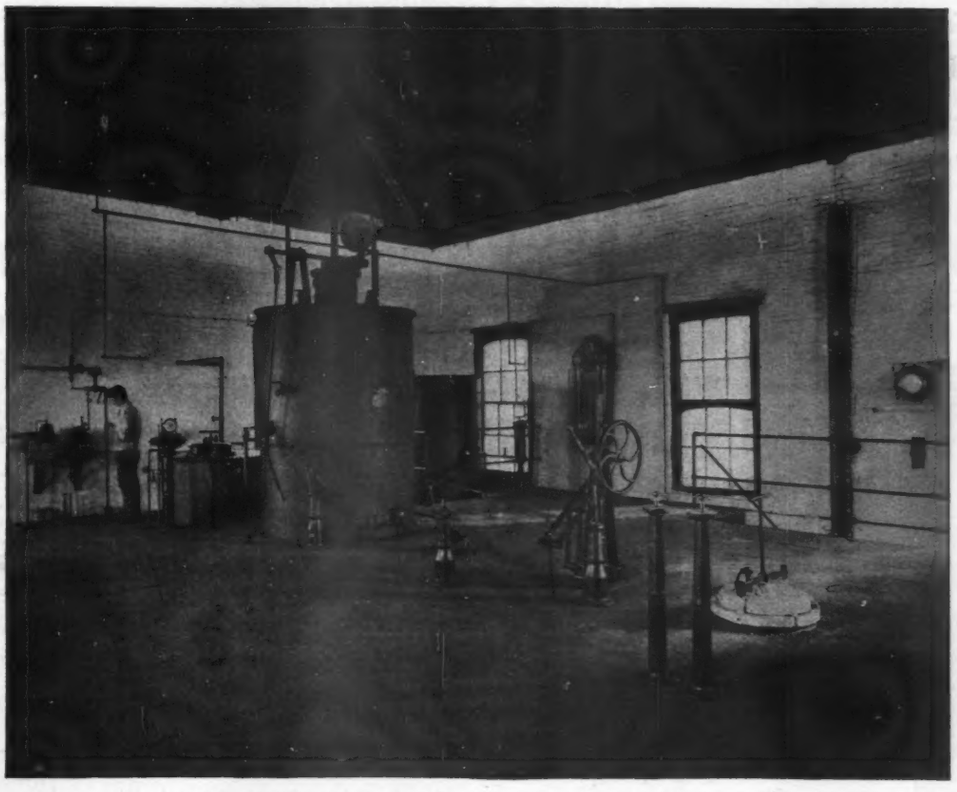

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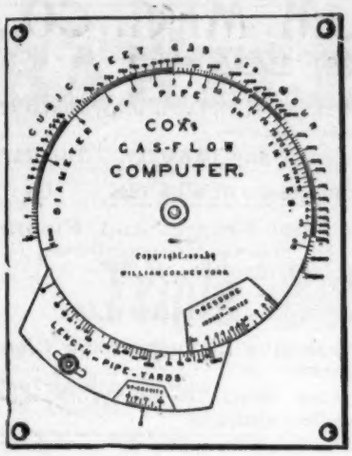

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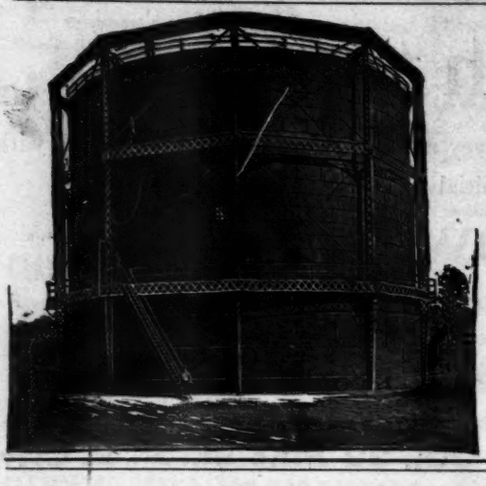

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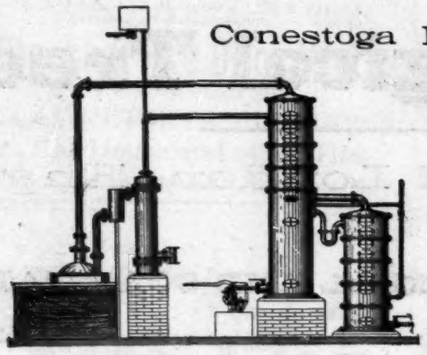

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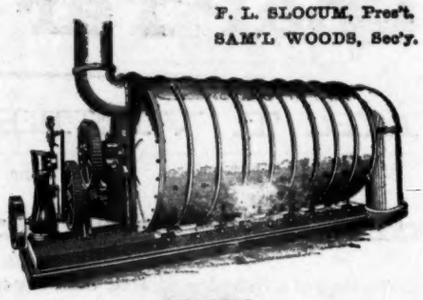

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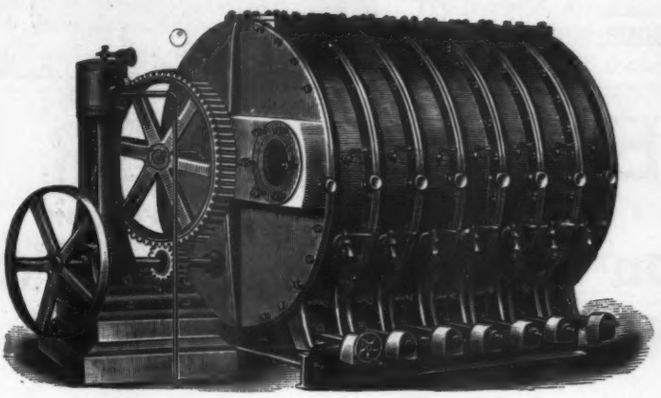

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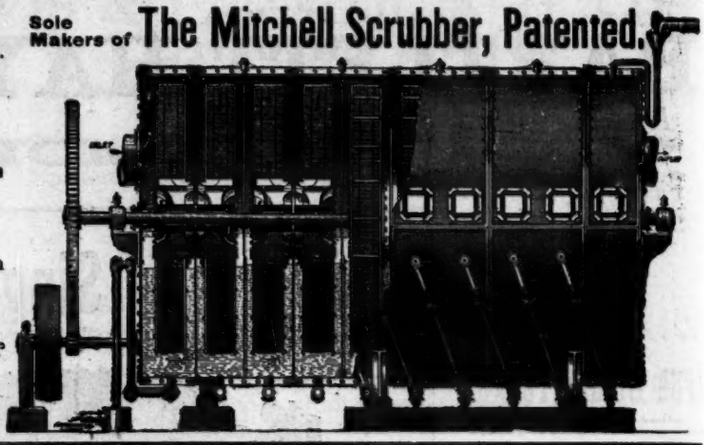

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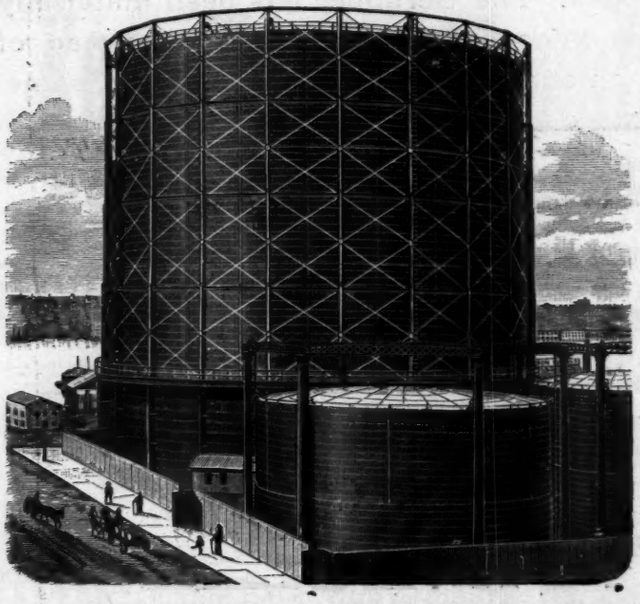

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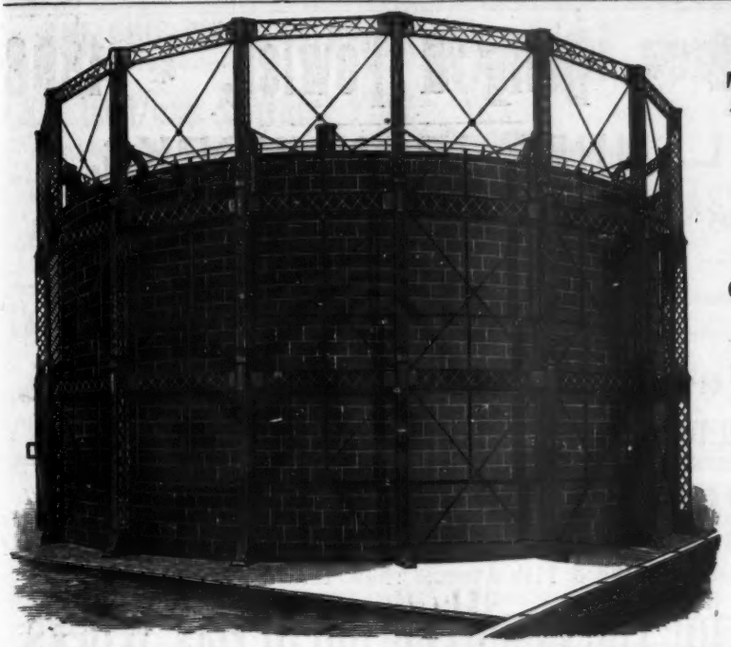

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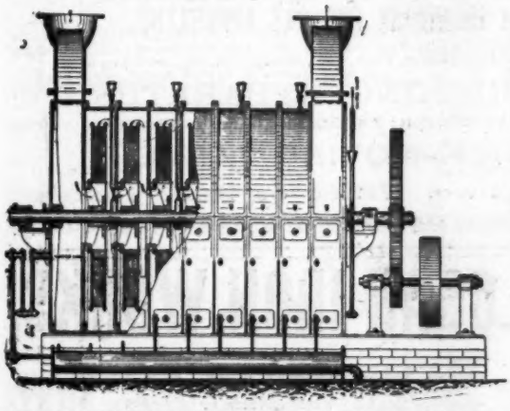

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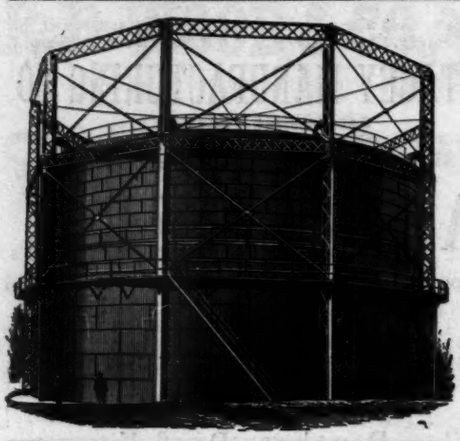

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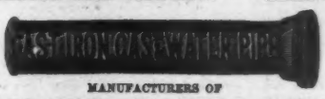

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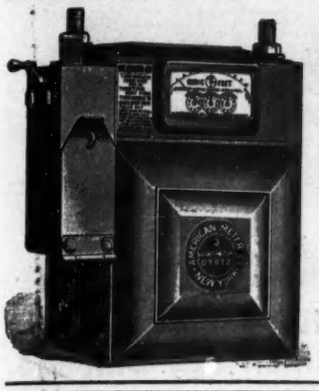

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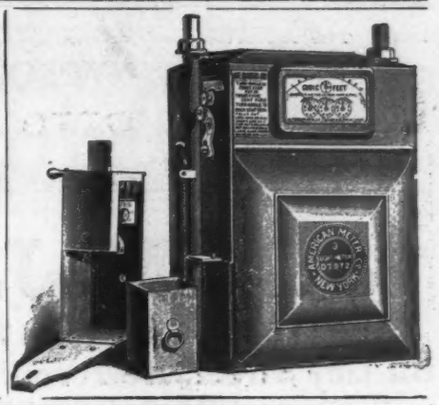

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